Opera Instituti Archaeologici Sloveniae

9

Viktorjev spodmol in/and Mala Triglavca

Prispevki
k poznavanju mezolitskega obdobja
v Sloveniji

Contributions to
understanding the Mesolithic period
in Slovenia

Zbral in uredil / Collected and edited by
Ivan Turk

OPERA INSTITUTI ARCHAEOLOGICI SLOVENIAE

9

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VIKTORJEV SPODMOL IN MALA TRIGLAVCA
PRISPEVKI K POZNAVANJU MEZOLITSKEGA OBDOBJA V SLOVENIJI
VIKTORJEV SPODMOL AND MALA TRIGLAVCA
CONTRIBUTIONS TO UNDERSTANDING THE MESOLITHIC PERIOD IN SLOVENIA

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Knjigo posvečam pionirju slovenske speleoarheologije
Francetu Lebnu-Aciju.

I dedicate this book to the pioneer of Slovene speleoarchaeology
France Leben-Aci.

I. T.

VIKTORJEV SPODMOL IN MALA TRIGLAVCA

PRISPEVKI K POZNAVANJU MEZOLITSKEGA OBDOBJA V SLOVENIJI

VIKTORJEV SPODMOL AND MALA TRIGLAVCA

CONTRIBUTIONS TO UNDERSTANDING THE MESOLITHIC PERIOD IN SLOVENIA

Zbral in uredil / Collected and edited by
IVAN TURK

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LJUBLJANA 2004

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1. DEL / PART 1

VIKTORJEV SPODMOL

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1. Uvod

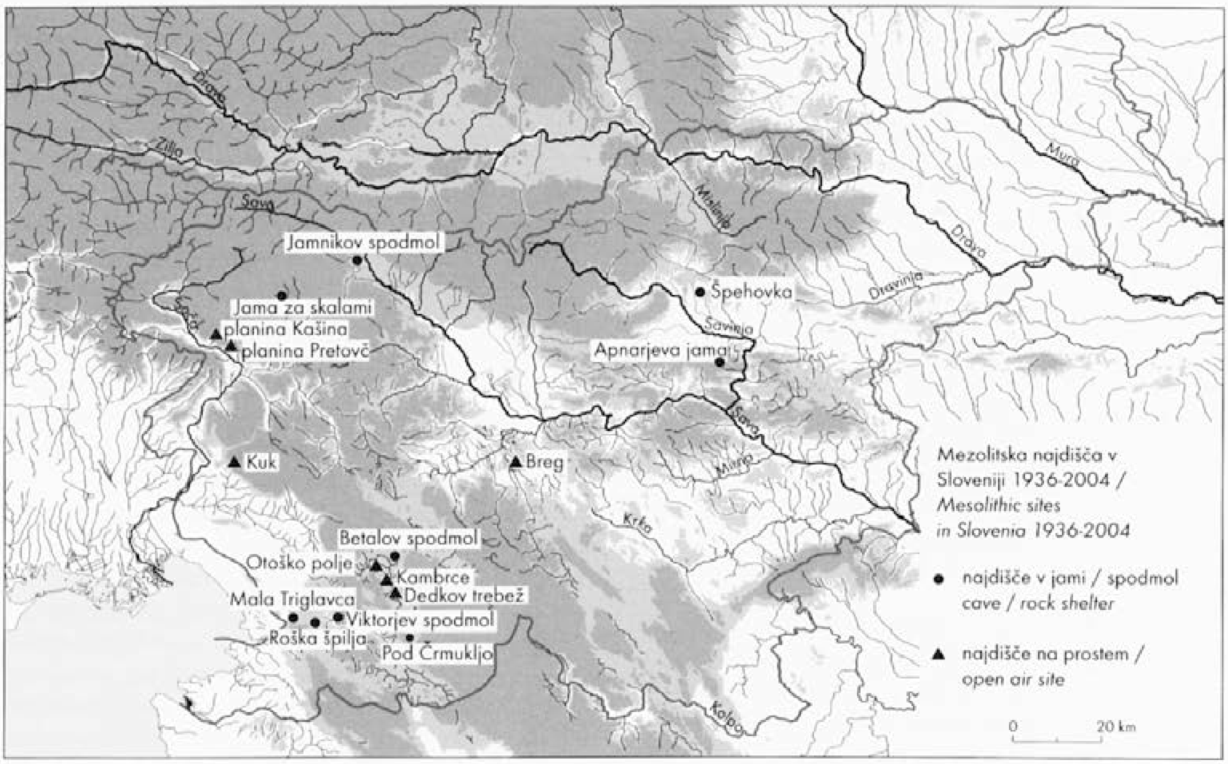
1. Introduction

Ivan Turk

Mezolitik Slovenije je slabo poznan v smislu poselitvene slike, kronologije in pripadnosti. Ne samo da je število najdišč majhno (sl. 1.1) in najdbe večinoma skromne, slabo utemeljene so tudi povezave z bolje raziskanimi mezolitskimi kompleksi zunaj Slovenije. Nova odkritja na Krasu so to stanje izboljšala, še več, odprla so možnost, da se vsaj mezolitik Krasa bolj utemeljeno ovrednoti, tako z arheološkega kot ekološkega vidika, kar je poglavitni namen te knjige. To smo avtorji dosegli na podlagi dveh izredno bogatih najdišč (Viktorjev spodmol ali Podjamca in MalaTriglavca), kjer so arheološke najdbe oplemenitene z najdbami človeških ostankov, ostankov velikih in malih sesalcev, ektotermnih vretenčarjev, mehkužcev in rastlin.

Viktorjev spodmol so v letih 1997 in 1999 sondažno raziskali V. Saksida, J. Dirjec in I. Turk.

The Mesolithic in Slovenia is poorly known in the sense of settlement pattern, chronology and affiliations. It is not just that the number of sites is small (Fig. 1.1) and finds relatively modest, links with more fully researched Mesolithic complexes outside Slovenia are also poorly grounded. New discoveries on the Karst have improved this situation, they have even opened possibilities of evaluating at least the Mesolithic of the Karst more thoroughly, both from the archaeological and the ecological points of view, which is the main purpose of this book. The authors have achieved this on the basis of two exceptionally rich sites (Viktorjev spodmol, or Podjamca, and Mala Triglavca), where archaeological finds have been enriched with finds of human remains, the remains of both large and small mammals, ectothermic vertebrates, molluscs and plants.



Sl. 1.1: Domnevna in nesporna mezolitska najdišča v Sloveniji. Izdelala M. Belak.
Fig. 1.1: Suspected and indisputable Mesolithic sites in Slovenia. Produced by M. Belak.

Sistematske arheološke raziskave v Mali Triglavci (odslej M. Triglavca) je začel F. Leben (1988), nadaljuje pa jih M. Budja. Pri tem so bili med drugimi najdbami odkriti tudi redki mezolitski artefakti. Zato sem I. Turk v letih 1998 in 2001 opravil manjšo kontrolno raziskavo, ne da bi posegel v plasti najdišča. Namen te raziskave je bil pobrati vse drobne arheološke in druge najdbe, ki bi lahko ostale v deponiranem odkopu Lebnovih izkopavanj ti. mezolitske plasti.

Zaradi bogatih najdb v sondi Viktorjevega spodmola in v Lebnovem odkopu v M. Triglavci sem se z avtorji te knjige odločili za monografski prikaz obeh najdišč. Pri tem se zavedam, da sta najdišči daleč od tega, da bi bili raziskani, saj je bilo vse gradivo pridobljeno z minimalnim posegom v najdišče oziroma samo s ponovnim pregledovanjem že odkopanih in pregledanih usedlin. Sistematična izkopavanja, do katerih mora prej ali slej priti, bodo, če bodo pravilno načrtovana in izpeljana, bistveno dopolnila tu podani celostni prikaz obeh mezolitskih najdišč.

Upam, skupaj s soavtorji, da bo ta knjiga spodbuda in koristen delovni priročnik za bodoče slovenske raziskovalce 'kraškega mezolitika'.

VIKTORJEV SPODMOL

V. Saksida, J. Dirjec and I. Turk researched Viktorjev spodmol on an exploratory basis in 1997 and 1999.

F. Leben began systematic archaeological research in Mala Triglavca (hereinafter: M. Triglavca) in 1988, and it was continued by M. Budja. Occasional Mesolithic artefacts were discovered among other finds. I. Turk therefore carried out a small control investigation in 1998 and 2001, without encroaching on the layers of the site. The purpose of this research was to collect all the tiny archaeological and other finds which may have remained in the earth deposited from Leben's excavation of the so-called Mesolithic layers.

Because of the rich finds in the test trench of Viktorjev spodmol and in Leben's excavation in M. Triglavca, together with the other author's of this book I decided on a monograph presentation of the two sites. I am aware that the sites are far from having been fully researched, since all the material was obtained with minimum encroachment at the site or only with a re-examination of the already excavated and examined sediments. Systematic excavations, which must be done sooner or later, if properly planned and carried out will add significantly to the overall presentation given here of the two Mesolithic sites.

I and my fellow authors hope that this book will be an encouragement and useful working manual for future Slovene researchers of the "Karst Mesolithic".

2. Kratka zgodovina raziskav mezolitika v Sloveniji

2. Brief History of Research of the Mesolithic in Slovenia

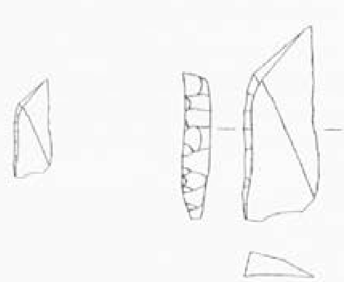
Ivan Turk

Raziskave mezolitika v Sloveniji segajo v čas zgodnjih izkopavanj S. Brodarja in njegovega odkritja prvih mezolitskih najdb v jami Špehovki (Brodar S. 1938, 165; t. 10: 2-3; Brodar M. 1993, 19, t. 8: H, h). Nazadnje je te raziskave izčrpno povzel D. Josipovič (1992) v svoji magistrski nalogi. Temu je treba danes dodati še nova odkritja planih najdišč v sredogorju in drugje, za katera so zaslužni tudi amaterski iskalci. Pri tem mislim predvsem na Kuk pri Trnovem (gradivo sta zbrala in mi ga pokazala J. Bizjak in P. Jamnik; neobjavljeno) in planino Pretovč nad Tolminom (J. Bizjak in P. Jamnik; neobjavljeno), kjer sta bili med drugim najdeni geometrični armaturi (sl. 2.1), ki z veliko verjetnostjo kažeta na prisotnost mezolitskih lovcev in nabiralcev na teh lokacijah. Mezolitsko je verjetno tudi novoodkrito najdišče na planini Kašina nad vasjo Krn (Jamnik, Bizjak 2003). Višinska najdišča glede na stanje v zahodnih Julijskih Alpah, na Mokrinah in Matajurju na italijanski strani (Guerreschi 1998, 82, sl. 6), če omenim samo lokacije najbližjih podobnih najdišč, niso nikakršno presenečenje in jih lahko v bodoče pričakujemo še več. Zaradi prve vojne so vsa znana višinska najdišča močno poškodovana, kar je za stroko zelo neugodno, saj je njihova izpovedna moč okrnjena.

Kot pomembno naključno najdbo naj na tem mestu omenim popolnoma ohranjeno ost z zobci samo na enem robu. Našel jo je M. Potočnik (1988-1989, 391, t. 3: 22) v osemdesetih letih v strugi Ljubljanice (sl. 2.2). Najdbo hrani Narodni muzej Slovenije (inv. št. P 18 405, predmet pridobljen l. 1989). Zaradi pomanjkanja dodatnih podatkov njena pripadnost mezolitiku ni absolutno zanesljiva, je pa zelo verjetna. Mezolitsko pripadnost bi utrdilo ali omajalo samo ^{14}C datiranje.

Ost je narejena iz rogovja navadnega jelena. Na zunanji strani se vidi značilna zgradba površine rogovja. Dolga je 23,2 cm, največja širina je 2,5 cm, največja debelina pa 0,7 cm. Na notranji strani je rahlo izbočena. Bazalno in terminalno je prišiljena z vseh strani. Terminalna konica je rahlo zglajena (morda od uporabe). Zobci imajo odlomljene vršičke, razen dveh, ki sta nepoškodovana. Zobci so bili izrezani z ostrim orodjem, verjetno s kremenovim nožičkom. Najdba je domnevno služila kot ost kopja in ne kot harpuna, ki je s toporiščem povezana z vrvico. Na predmetu namreč ni nobenega primernega mesta za pritrditev vrvice.

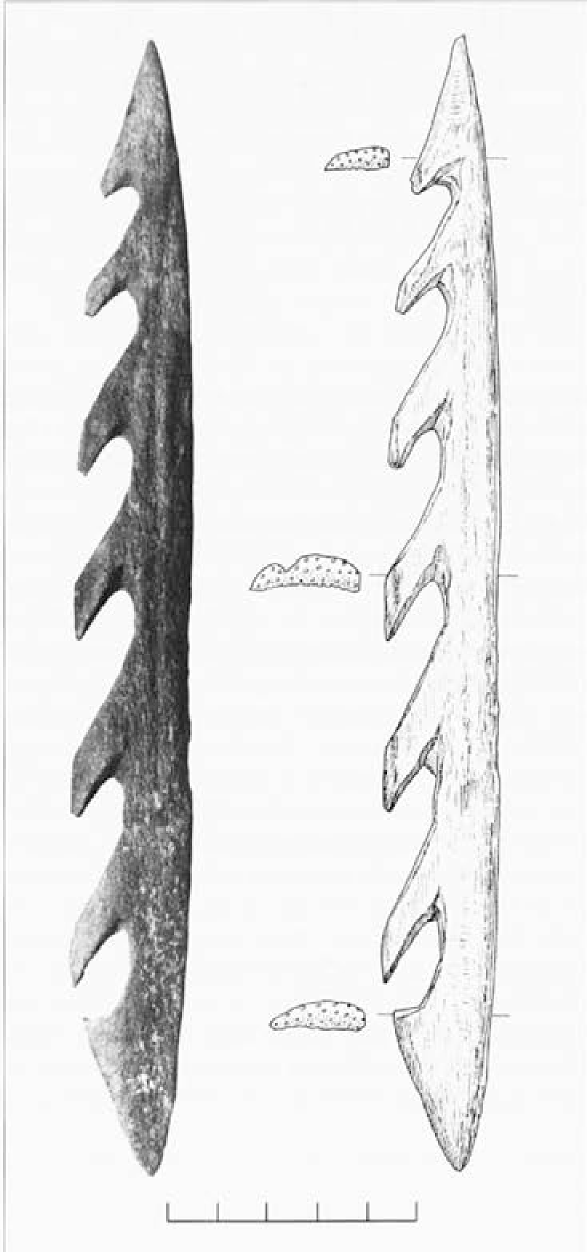
Research of the Mesolithic in Slovenia goes back to the early excavations of S. Brodar, and his discovery of the first Mesolithic finds in the cave of Špehovka (Brodar S. 1938, 165; Plate 10: 2-3; Brodar M. 1993, 19, Plate 8: H, h). D. Josipovič (1992) summarised these investigations exhaustively in his master thesis. To these must today be added new discoveries of open air sites in the medium high mountains, for which amateur explorers also deserve credit. Notably there is Kuk near Trnovo (J. Bizjak and P. Jamnik collected the material and showed it to me; unpublished), and the mountain pasture of Pretovč above Tolmin (J. Bizjak and P. Jamnik; unpublished), where geometric armatures were found (Fig. 2.1), indicating a high probability of the presence of Mesolithic hunters and gatherers in these locations. A newly discovered site on the mountain pasture of Kašina above the village of Krn (Jamnik, Bizjak 2003) is also probably Mesolithic. In view of the situation in the western Julian Alps, on Mokrine and Matajur on the Italian side (Guerreschi 1998-1999, 82, sl. 6), to mention only the locations of the nearest similar sites, the altitude of the sites are in no way surprising and we can expect more of them in the future. Because of the First World War, all



Sl. 2.1: Planina Pretovč (1150 m) nad Tolminom: nedokončan trikotnik oziroma klinica s hrbtom in prečno retušo ali samo klinica s hrbtom. Naravna velikost in enkrat povečano. Risal M. Turk.

Fig. 2.1: Planina Pretovč (1150 m) above Tolmin: unfinished triangle or backed, truncated bladelet or merely backed bladelet. Natural size and magnified once. Drawn by M. Turk.

VIKTORJEV SPODMOL



Sl. 2.2: Ost z zobci iz struge Ljubljanice tik pod izlivom Ižice. Merilo je podano v cm. Fotografija T. Lauko, risba D. Knific Lunder. Objavljeno z dovoljenjem Narodnega muzeja Slovenije, št. 34/2003.
Fig. 2.2: Barbed point from the riverbed of the Ljubljanica immediately below the mouth of the Ižica. Measurements are given in cm. Photograph by T. Lauko, drawing by D. Knific Lunder. Published by permission of the National Museum of Slovenia no. 34/2003.

Mezolitske najdbe so znane v Sloveniji od leta 1936, vendar je imelo zbrano gradivo, z izjemo najdišča Pod Črmukljo, majhno izpovedno moč. V gradivu so bile z redkimi izjemami zastopane armature geometrijskih oblik, ki so glavna značilnost mezolitskih inventarjev širom po Evropi. Ker te armature sodijo v skupino mik-

the known high altitude sites are greatly damaged, which is very unfortunate for the profession since their informative value is thus greatly curtailed.

One important chance find worth mentioning here is a completely preserved barbed point. It was found by M. Potočnik (1988-1989, 391, Plate 3: 22) in the eighties in the riverbed of the Ljubljanica (Fig. 2.2). The find is kept in the National Museum of Slovenia (inv. no. P 18405, item obtained in 1989). Because of the lack of additional data, it is not absolutely certain that it is Mesolithic, but it is very probable. Only ^{14}C dating can confirm or exclude a Mesolithic origin.

The point is made from the antler of red deer. The characteristic surface structure of antler is visible on the outside. It is 23.2 cm long, 2.5 cm at its widest and has a maximum thickness of 0.7 cm. It is slightly convex on the inner side. It is sharpened on all sides basally and terminally. The terminal point is slightly polished (perhaps from use). The barbs have broken tips, except for two that are undamaged. The barbs were cut with a sharp tool, probably a flint knife. The find is suspected of having served as the point of a spear and not as a harpoon, which would have been linked to the haft with a line. This item, namely, has no suitable place for the attachment of a cord.

Mesolithic finds have been known in Slovenia since 1936, but the material collected, except for the Pod Črmukljo site, had little informative power. With few exceptions, the material represented geometric armatures, which are the main characteristic of Mesolithic inventories throughout Europe. Since these armatures belong in the group of microlithic, often even hypermicrolithic (pygmy) tools, it was not possible to find them with the then available fieldwork techniques. So the majority of Slovene Mesolithic sites were unable to tell us enough for deductions about their cultural affiliation. D. Josipović (1992, 60), for example, believed that the majority of sites, including M. Triglavca, could not be defined in more detail. M. Frelih (1986) was the first to classify the site at Breg as Castelnovian. M. Brodar (1992, 29) was cautious in classifying the site at Pod Črmukljo, though he remained convinced of links between our Mesolithic and the Tardenoisian. In connection with M. Triglavca, he wrote that the finds were from a specific Mesolithic culture (Brodar 1995, 17). However, he did not say what type and in what way it was specific. F. Leben (1988, 71) was no clearer, writing that the finds from the deepest archaeological layers 'indicate some Mesolithic tradition'. He believed that the stone tools 'show some pre-Neolithic microlithic forms', and although with the possible exception of a single example (Leben 1988, Plate 2. 17), he did not publish any microliths, he correctly found links between finds from M. Triglavca and Mesolithic sites on the Triestine Karst. D. Josipović (1992, 52) ascribed a 'Mesolithic habitus' to stone tools from M. Triglavca.

rolitskih, večkrat celo hipermikrolitskih (pigmejskih) orodij, jih s tedanjimi terenskimi tehnikami ni bilo mogoče najti. To je bil poglavitni vzrok za neizpovednost inventarjev večine slovenskih mezolitskih najdišč in s tem povezano ugibanje o njihovi kulturni pripadnosti. D. Josipovič (1992, 60) je na primer menil, da večine najdišč, vključno z M. Triglavco, podrobneje ne moremo opredeliti. M. Frelih (1986) je bil prvi, ki je najdišče Breg opredelil kot kastelnovjensko. M. Brodar (1992, 29) je bil pri opredelitvi najdišča Pod Črmukljo previden, po drugi strani pa je vztrajal pri povezavah našega mezolitika s tardenoazjenom. V zvezi z M. Triglavco je napisal, da gre za najdbe neke specifične mezolitske kulture (Brodar 1995, 17). Ni pa povedal kakšne in v čem je njena specifičnost. Nič bolj jasen ni bil F. Leben (1988, 71), ki je napisal, da najdbe iz najgloblje arheološke plasti v M. Triglavci 'kažejo neko mezolitsko tradicijo'. O kamnitih orodjih je menil, da 'kažejo neke predneolitske mikrolitske oblike', čeprav z izjemo morda enega primerka (Leben 1988, t. 2. 17), ni objavil nobenega mikrolita, je pa pravilno ugotovil povezave med najdbami iz M. Triglavce in mezolitskimi najdišči na Tržaškem krasu. D. Josipovič (1992, 52) je kamenim orodjem iz M. Triglavce pripisal 'mezolitski habitus'.

Presenetljivo je, da nobeden od naštetih avtorjev ni pomislil na to, kaj je pravi vzrok za slabo primerljivost našega mezolitika z evropskim, predvsem pa z bližnjim 'italskim'. Vsi po vrsti so navajali, da je treba odkriti nova, bogatejša najdišča, nihče pa se ni vprašal, kakšne so bile metode, s katerimi je bilo gradivo pridobljeno. Odgovor na to vprašanje poskušamo podati v tej knjigi.

Verjetno ni naključje, da je zelo pomembno najdišče Pod Črmukljo, ki je dolgo ostalo neobjavljeno, odkril italijanski amater Mario de Ruiz leta 1964. V tem času so v severni Italiji amaterski iskalci odkrivali prva mezolitska najdišča, in sicer najprej na Tržaškem krasu. Začelo se je s Pečino na Leskovcu - *Grotta Azzurra di Samatorza* leta 1961 (Radmilli 1963) in nadaljevalo v 60-ih in 70-ih letih z vrsto sedaj že legendarnih spodmolov na Krasu (Canarella 1984). Edina zanesljiva vez med kraškimi najdišči na obeh straneh državne meje so bile dolgo časa najdbe iz najdišča Pod Črmukljo.

V zvezi z mezolitskimi raziskavami v Sloveniji moram omeniti tudi prizadevanja, da se najdišča obravnavajo vsestransko, vključno z ostanki favne in flore. Pri tem imajo glavne zasluge V. Pohar (1984, 1986, 1990), M. Culiberg in A. Šercelj. Vendar je bila pobuda za vsestranski potek raziskave vedno na strani odgovornih raziskovalcev najdišč.

Podoba našega mezolitika se je temeljito spremenila v letih 1997-2001 na podlagi skromnih, vendar natančnih raziskav v Viktorjevem spodmolu (ali Podjamci)[1] in z revizijo deponije že pregledanih sedimentov v M. Triglavci.

[1] Pri Zazidu je ista ekipa, ki je odkrila Viktorjev spodmol, odkrila

It is surprising that none of these authors gave any thought to the real reason for the poor comparability of our Mesolithic with the European, and above all with the nearby "Italic". Each in turn stated that new, richer sites must be found, but nobody asked what methods were used to obtain the material. We attempt to give an answer to this question in this book.

It is probably no coincidence that the very important site Pod Črmukljo, which long remained unpublished, was discovered by an Italian amateur, Mario de Ruiz, in 1964. Amatateur explorers in northern Italy were discovering the first Mesolithic sites, initially on the Triestine Karst. It started with Pečina na Leskovcu (*Grotta Azzurra di Samatorza*) in 1961 (Radmilli 1963) and continued in the 60s and 70s with a series of then already legendary overhang caves on the Karst (Canarella 1984). The finds from the Pod Črmukljo site were for long the only reliable link between the Karst sites on the two sides of the state border.

In connection with Mesolithic research in Slovenia I must also mention attempts to deal with sites in an all-round manner, including remains of fauna and flora. The main credit in this goes to V. Pohar (1984, 1986, 1990), M. Culiberg and A. Šercelj. However, the initiative for the all-round course of research always came from the investigators responsible for the sites.

The perception of our Mesolithic thoroughly changed in the years 1997-2001, on the basis of modest but precise investigations in Viktorjev spodmol (or Podjamci)[1] and with a review of the deposits of already examined sediments in M. Triglavca.

In the future, in addition to research of cave sites on the Karst and in the valley of the Reka (especially on escarpments), above all sites on the Ljubljansko barje (Ljubljana moor), Cerkniško jezero (Cerknica lake) and its surroundings (Rakov Škocjan), the Vipava valley including the edges of the mountain plateau from Predmeja to Trnovo, and in Posočje (Soča valley), including lower parts of the Julian Alps, will affect our knowledge of the Mesolithic. We can expect a denser network of Mesolithic sites in all of the mentioned areas (in the open, in rockshelters, beneath overhangs and beside boulders).

Viktorjev spodmol dealt with here has a very short but complex history of research. In the archaeological sense, it was discovered by Viktor Saksida (henceforth Viktor), the founder and for many years head of the archaeological section of the Caving Society in Sežana, who was also responsible for the discovery of other cave ar-

[1] At Zazid, the same team that had discovered Viktorjev spodmol, discovered another important site with a similar name. This is Viktorjeva pečina alias Jama pred Senico, which has unfortunately remained unstudied because of a variety of unfavourable circumstances.

VIKTORJEV SPODMOL

V bodoče bodo poleg raziskav jamskih najdišč na Krasu in v dolini Reke (zlasti v reliefnih stopnjah) na védenje o mezolitiku vplivale predvsem raziskave najdišč na Ljubljanskem barju, Cerkniškem jezeru z okolico (Rakov Škocjan), v Vipavski dolini, vključno z robom planote od Predmeje do Trnovega, in v Posočju, vključno z nižjimi predeli Julijskih Alp. Na vseh omenjenih področjih lahko pričakujemo gostejšo mrežo mezolitskih najdišč (na planem, v spodmolih, pod previsi in ob balvanih).

Tukaj obravnavani Viktorjev spodmol ima zelo kratko in zapleteno zgodovino raziskav.

V arheološkem smislu ga je odkril Viktor Saksida (odslej Viktor), ustanovitelj in dolgoletni vodja arheološke sekcije Jamarskega društva v Sežani, ki je zaslužen tudi za odkritje drugih jamskih arheoloških najdišča na Krasu v letih 1985-1997 (Turk 1987; Saksida, Turk 1988; Pavlin, Dirjec, Saksida 1990; Turk, Saksida 1990; Dirjec, Turk, Saksida 1991). Avgusta 1997 je skupaj z Ludvikom Husujem, članom istega društva, v južnem delu spodmola izkopal približno1x 2 m veliko in približno meter globoko sondo. Potem ko je na celotni površini sonde naletel na velike podorne bloke, je končal izkopavanje in o najdbah obvestil Inštitut za arheologijo ZRC SAZU v Ljubljani ter Zavod za varstvo kulturne dediščine Slovenije v Novi Gorici. Najdbe in najdišče sta si v naslednjih dneh ogledala J. Dirjec in I. Turk. Slednji je prevzel najdbe, ki jih je nabral Viktor, in se odločil, da preseje in natančno pregleda nekaj odkopanega sedimenta iz Viktorjeve sonde. V ta namen je sediment pripeljal na dom in ga spral na sitih, pripeljanih z Divjih bab I, kjer so tedaj potekala večja izkopavanja s spiranjem vseh odkopanih sedimentov.

Pozitiven rezultat pregleda, ki je dal nekaj zanesljivo mezolitskih mikrolitov, ki jih je Viktor vse do zadnjega spregledal, je I. Turka spodbudil, da je s pomočjo J. Dirjeca septembra istega leta spral na sitih in natančno pregledal še več sedimentov iz Viktorjeve sonde (sl. 2.3). Spiranje sta kljub tehnični zahtevnosti, ki jo je predstavljala napeljava vode iz oddaljenega vira, opravila na samem najdišču v dveh dnevih, pregled spranega sedimenta pa na Inštitutu za arheologijo. Uspeh ni izostal in postalo je jasno, da je Viktor pomagal odkriti zelo bogato mezolitsko najdišče.

Zato je I. Turk za naslednja leta (1999-2001) načrtoval sistematično raziskavo najdišča in prijavil leta 1998 ustrezen projekt s šifro K6-1319-0618-99 pri Ministrstvu za znanost in tehnologijo Republike Slovenije. Vendar projekt ni bil sprejet.z utemeljitvijo, da se ne more uvrstiti na nacionalni seznam projektov za leto 1999 zaradi prenizke uvrstitve v evalvacijskem postopku. To je od-

še eno pomembno najdišče s podobnim imenom. To je Viktorjeva pečina ali Jama Pred senico, ki je ostalo, žal, neraziskano, zaradi spleta neugodnih okoliščin.

chaeological sites on the Karst from 1985-1997 (Turk 1987; Saksida, Turk 1988; Pavlin, Dirjec, Saksida 1990; Turk, Saksida 1990; Dirjec, Turk, Saksida 1991). In August 1997, together with Ludvik Husu, a member of the same society, he excavated a 1 x 2 m and approximately one metre deep test trench in the lower part of the rockshelter. When he came across a large fallen rock over the entire area of the test trench, he ended the excavation and informed the Institute of Archaeology ZRC SAZU in Ljubljana and the Institute for the Protection of the Cultural Heritage of Slovenia in Nova Gorica about the finds. The finds and the site were examined in the following days by J. Dirjec and I. Turk. The latter took over the finds that Viktor had collected and decided to sieve and carefully examine some of the excavated sediments from Viktor's test trench. For this purpose, he brought the sediment home and washed it on a sieve brought from Divje babe I, where major excavations with wet sieving of all excavated sediments were currently taking place.

Sl. 2.3: Spiranje sedimentov iz Viktorjeve sonde v najdišču. Spiranje opazujeta Viktor Saksida (drugi z leve) in Ludvik Husu (tretji z leve). Foto I. Turk.

Fig. 2.3: Wet sieving sediments from Viktor's test trench at the site. The washing is being watched by Viktor Saksida (second from left) and Ludvik Husu (third from left). Photo I. Turk.

ločilno vplivalo na nadaljnji potek raziskav, saj zanje ni bilo na voljo posebnega denarja, zaradi česar tudi predstavitev izsledkov ni bila obvezujoča, toda interes je ostal in pripravljenost, da se zadeva reši na neformalen način in z minimalnimi sredstvi tudi.

Na pobudo J. Dirjeca je bil leta 1999 sistematično izkopan ozek pas profila (20 x 200 x 100 cm) Viktorjeve sonde z namenom, ugotoviti stratigrafijo najdb (sl. 2.4). Akcija (dovoljenje Ministrstva za kulturo RS, št. 617-18/98), pri kateri sta sodelovala samo J. Dirjec in I. Turk, je trajala tri dni, nakar sta sondo zasula. Ves odkopan sediment sta pripeljala v Bistro pri Vrhniki in ga s pomočjo sodelavca D. Valoha v petih dneh sprala na sitih (sl. 2.5). Sledilo je dolgotrajno pregledovanje izpranih sedimentov na Inštitutu za arheologijo in iskanje sodelavcev za obdelavo različnih najdb zunaj formalnih raziskovalnih programov. Zaradi vsega tega so se dela zelo zavlekla.

Vzporedno z raziskavami Viktorjevega spodmola je potekal neformalni program revizije dela odkopanih sedimentov M. Triglavce. Pobudo zanj je dal I. Turku pokojni France Leben, ki je vodil izkopavanja v M. Triglavci v letih 1980–1985 (Leben 1988). Prvo uspešno sondiranje v M. Triglavci je pod njegovim vodstvom opravil prav I. Turk leta 1979. Leta 1998 je vzel z deponije približno 270 kg odkopanih sedimentov domnevne mezolitske plasti, ki jih je že suho presejala in pregleda-

The positive results of the examinations, which gave some reliable Mesolithic microliths that Viktor had overlooked, encouraged I. Turk, assisted by J. Dirjec, in September of the same year to sieve wash and carefully examine additional sediments from Viktor's test trench (Fig. 2.3). Despite the technically demanding nature, caused by the need to lead water from a distant locality, the wet sieving was carried out at the site itself over the course of two days, and the washed sediments were examined at the Institute of Archaeology. There was no lack of success and it became clear that Viktor had helped to discover a very rich Mesolithic site.

The following year (1999–2001), I. Turk planned systematic investigation of the site and in 1998 prepared a suitable project with reference number K6-1319-0618-99 at the Ministry of Science and Technology of the Republic of Slovenia. However, the project was not accepted, on the grounds that it had gained too few points in the evaluation procedure to be placed on the national list of projects for 1999 because of too low a ranking. This had a decisive influence on the further course of the research, since special funds were not available for it, because of which even a presentation of the results was not mandatory, although interest remained and a willingness to resolve the matter in an informal way and also with minimal funds.

At the initiative of J. Dirjec, in 1999 a narrow band

Sl. 2.4: Sistematično izkopavanje ozkega pasu profila Viktorjeve sonde. Foto I. Turk.
Fig. 2.4: Systematic excavation of a narrow band of the profile of Viktor's test trench. Photo I. Turk.

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Sl. 2.5: Spiranje in pregledovanje sedimentov iz profila Viktorjevega spodmola v Bistri pri Vrhniki. Foto J. Dirjec.
Fig. 2.5: Wet sieving and examining sediments from the profile of Viktorjev spodmol in Bistra by Vrhnika. Photo J. Dirjec.

la Lebnova ekipa v zadnjem letu sistematičnih izkopavanj. Te sedimente je naslednje leto mokro presejal in natančno pregledal na Reki pri Cerknem, ker drugje to ni bilo mogoče. Tako je poleg drugih najdb našel 56 kamenih orodij (11 praskal, 14 trapezov, 2 klinici, 9 raznostraničnih trikotnikov in 2 mikrokonici) in tehnoloških kosov (18 mikro vbadal). Zato je leta 2001 vzel še več sedimenta (1.407 kg), ga dal na Planini pri Rakeku mokro presejati in natančno pregledati na Inštitutu za arheologijo. Tako ustvarjena zbirka spregledanih mezolitskih artefaktov je bila kompatibilna z zbirko v Viktorjevem spodmolu in je lahko brez pomislekov služila za primerjavo med najdišči.

of the profile (20 x 200 x 100 cm) of Viktor's test trench was systematically excavated in order to establish the stratigraphy of the finds (Fig. 2.4). The action (permit of the Ministry of Culture RS, no. 617-18/98), in which only J. Dirjec and I. Turk took part, lasted three days, and the trench was then filled in. All the excavated sediments were brought to Bistra by Vrhnika and with the help of a colleague, D. Valoh, sieve washed in five days (Fig. 2.5). A lengthy examination of the washed sediments then followed at the Institute of Archaeology, together with a search for collaborators for processing the various finds outside formal research programmes. Because of all this, the work dragged on considerably.

In parallel with investigation of Viktorjev spodmol, an informal programme of review of part of the excavated sediments of M. Triglavca was also taking place. The late France Leben, who led the excavations in M. Triglavca in 1980-1985 (Leben 1988), gave the initive for it to I. Turk. The first successful test trench in M. Triglavca had been dug under his leadership by I. Turk in 1979. In 1998, he took from the deposits approximately 207 kg of excavated sediments of suspected Mesolithic layers which Leben's team had dry sieved and examined in the last year of systematic excavations. These sediments were wet sieved and carefully examined the following year at Reka near Cerkno, because it was not possible elsewhere. Thus, in addition to other finds, he found 56 stone tools (11 endscrapers, 14 trapezes, 2 blades, 9 scalene triangles and two micropoints) and technological pieces (18 micro burins). Even more sediments were therefore taken in 2001 (1407 kg), wet sieved at Planina near Rakek and carefully examined at the Institute of Archaeology. The collection of overlooked Mesolithic artefacts thus created was compatible with the collection from Viktorjev spodmol and could without hesitation serve for comparison between the two sites.

3. Topografija Viktorjevega spodmola

3. Topography of Viktorjev Spodmol

Ivan Turk

Viktorjev spodmol je lociran pod Vremščico (1027 m) v dolini reke Reke[1]. Gre za geografsko pomembno lego ob reki, ki v komunikacijskem smislu povezuje ožji Kras z Ilirskobistriško in Pivško kotlino ter Tržaški in Reški zaliv. Verjetno ni naključje, da na tej trasi ležijo vsa pomembnejša mezolitska najdišča pri nas: M. Triglavca, Viktorjev spodmol, Pod Črmukljo, Dedkov trebež.

Geografsko zaledje Viktorjevega spodmola je zelo pestro (Geografski atlas Slovenije 1998).

Proti zahodu se razprostira nizka planota klasičnega krasa z ravniki, v vseh drugih smereh pa visoka planota, za katero so značilni zaobljeni vrhovi, visoki do 1056 m, hribovska in gričevska slemena, ozke in široke rečne doline, slepe doline, reliefne stopnje, udornice, jame in brezna.

Glavni kamnini sta apnenec in fliš. Slednjega najdemo tudi v dolini reke Reke in v gričevnatem svetu Brkinov. V apnencu se je izoblikovalo površje visokega in nizkega dinarskega krasa z dvema izrazitima reliefnima stopnjama, ki se vlečeta v dinarski smeri, ena od Črnega Kala in druga od Ilirske Bistrice. V obeh stopnjah so se izoblikovale številne jame in previsi s številnimi arheološkimi in paleontološkimi najdišči.

Na apnencu so nastale pokarbonatne prsti in rendzine, na flišu pa kisle rjave prsti.

Podnebje je zaledno submediteransko (Kras in dolina reke Reke do Ilirske Bistrice) in zmerno celinsko (visoka planota in Brkini). Na leto pade povprečno 1.400–1.600 mm padavin, povprečna letna temperatura je 8–12° C, na Vremščici 6–8 ° C.

V zmerni klimi, kakršna je značilna za holocen, lahko pričakujemo na širšem območju Viktorjevega spodmola naslednjo potencialno naravno vegetacijo. Na nizki kraški planoti in kraškem ravniku nizki gozd ali grmišče puhastega hrasta in gabrovca (*Ostryo-Quercetum pubescens*). Na območju doline Reke in okolnega gričevja z Brkini kisloljubni gozd bukve, kostanja in hrasta (*Castaneo-Fagetum*). Na visoki planoti z Vremščico submediteransko-predalpski podgorski gozd bukve in pirenejskega ptičjega mleka (*Ornithogalo pyrenaici-Fagetum*).

Omenjeni model potencialne vegetacije lahko zelo

[1] Natančnejše podatke o legi najdišča hrani arhiv Inštituta za arheologijo ZRC SAZU.

Viktorjev spodmol is located below the mountain of Vremščica (1027 m) in the valley of the river Reka[1]. It is a geographically important position by the river which in the communication sense links the narrower Karst with the Ilirska Bistrica and Pivka basins and Bays of Trieste and Rijeka. It is probably no coincidence that all the more important Mesolithic sites here are situated on this line: M. Triglavca, Viktorjev spodmol, Pod Črmukljo, Dedkov trebež.

The geographic hinterland of Viktorjev spodmol is very diverse (Geographic Atlas of Slovenia 1998).

Towards the west spreads a low plateau of classical karst with karst plain, polje, and in all other directions high plateau characterised by rounded peaks up to 1056 m high, hilly and undulating ridges, narrow and wide river valleys, blind valleys, escarpments, collapsed dolines, caves and abysses.

The main rocks are limestone and flysch. The latter is also found in the valley of the river Reka and in the hilly landscape of the Brkini. A surface of high and low Dinaric karst has been created in the limestone with two pronounced escarpments stretching towards the Dinarids, one from Črni Kal and the other from Ilirska Bistrica. In both escarpments have been formed numerous caves and overhangs with a number of archaeological and palaeontological sites.

Rendzinas have formed on the limestone, and acidic brown soils on the flysch.

The climate is hinterland submediterranean (Karst and valley of the river Reka to Ilirska Bistrica) and moderate continental (high plateau and Brkini). An average of 1400–1600 mm of precipitation falls annually, the average annual temperature is 8–12° C, on Vremščica 6–8 ° C.

In a moderate climate such as was characteristic of the Holocene, the following potential natural vegetation can be expected in the wider area of Viktorjev spodmol. On low karst plateaus and karst plain, low forest or scrub of downy oak and hornbeam (*Ostryo-Quercetum pubescens*). In the area of the Reka valley and the surrounding hills with the Brkini, acidophylous forest of

[1] More precise data on the site location is preserved in the archive of the Institute of Archaeology ZRC SAZU.

VIKTORJEV SPODMOL

odstopa od dejanske paleovegetacije, ki jo ugotavljamo predvsem na podlagi paleobotaničnih analiz na arheoloških najdiščih. Takšne analize pa so na obravnavanem področju šele v začetni fazi.

V širši okolici najdišča so bila domnevno različna naravna okolja z različnimi habitati, ki so bila porok za zanesljivo oskrbo lovsko-nabiralnih skupnosti, ki so nekoč živele na tem območju. Razdalje med različnimi okolji so bile kot danes majhne, kar je samo še dodatna prednost za vse, ki so v takšnem okolju živeli in bili odvisni od njegovih naravnih bogastev.

Viktorjev spodmol se je tako kot M. Triglavca izoblikoval v plastnatih rudistnih apnencih. Ostanke rudistov smo v večjem številu našli med jamskim gruščem.

Spodmol je ostanek zelo starega, danes porušenega jamskega sistema reke Reke (sl. 3.1). Od nekdanje

beech, chestnut and oak (*Castaneo-Fagetum*). On the high plateau with Vremščica, submediterranean-prealpine forest of beech and bath asparagus (*Ornithogalo pyrenaici-Fagetum*).

The aforementioned model of potential vegetation may differ considerably from the actual palaeovegetation which is ascertained mainly on the basis of palaeobotanical analyses at archaeological sites. Such analyses are only in the early stages in this area.

There were presumably various natural environments in the wider environment of sites, with various habitats guaranteeing reliable provision of the hunter-gatherer communities that formerly lived in this area. The distances between different environments, like today, were small, which is merely another advantage for all who lived in such an environment and were dependent on its natural resources.

Sl. 3.1: Tloris Viktorjevega spodmola z vrisano sondo. Črtkana linija označuje kap, polne linije so plastnice z označeno relativno višino pod mersko točko 0. Izmeril in posnel J. Dirjec ml., narisal J. Dirjec st.

Fig. 3.1: Ground plan of Viktorjev spodmol with the test trench outlines. The broken line marks the drip line, the full lines are contour lines of relative heights below the datum. Measured and realised by J. Dirjec jun., drawn by J. Dirjec sen.

jame se je ohranil samo kratek rov v severnem delu spodmola, v katerega pridemo skozi majhno odprtino pri tleh severne niše spodmola. Spodmol ima še eno nišo na jugu, ki se domnevno prav tako nadaljuje v danes popolnoma zasut rov. Obe glavni niši, ki ju loči ogromen podorni blok in povezovalni prostor med njima, tvorijo kakšnih 30 m^2 velik, pokrit, koliko toliko raven prostor, primeren za bivanje. Ta prostor se odpira proti J-JV in je večji del dneva lepo osončen, hkrati pa dobro zavarovan pred burjo.

Tla spodmola so precej ravna in posuta z velikimi podornimi bloki, ki so se odkrušili s previsa. Podorno skalovje je delno zasuto s holocenskimi sedimenti. Pod spodmolom se odpira široka dolina z rahlo nagnjenim dnom. Severno od spodmola se vleče skalni rob, ki ga kmalu prekine majhna, nagnjena dolinica, odprta na dve strani, na drugih dveh pa omejena s skalnim robom. Ta dolinica je domnevno ostanek podrtega velikega jamskega rova.

Viktorjev spodmol, like M. Triglavca, was formed in bedded rudist limestone. The remains of rudists were found in large numbers among the cave rubble.

The overhang cave is a remnant of the very old, today collapsed cave system of the river Reka (Fig. 3.1). Of the former cave only a short tunnel in the northern part of the overhang cave has been preserved, which is entered through small openings in the floor of the northern niche of the overhang cave. The overhang cave has another niche to the south which presumably similarly continues in a today completely blocked tunnel. Both main niches, which are separated by a huge fallen block, and the connecting space between them, create a covered, more or less level space of some 30 m^2, suitable for habitation. This space opens towards the south-southeast and is pleasantly sunny for the greater part of the day and, at the same time, well protected from the 'burja' (north wind).

The floors of the rockshelter are fairly level and sprinkled with large fallen blocks that have broken off the overhang. Below the rockshelter opens a wide valley with a slightly inclined bottom. North of the rockshelter stretches a rocky cliff, which is soon broken by a small, sloping valley, open on two sides, with the other two bounded by rocky cliffs. This little valley is presumably the remains of a collapsed large cave shaft.

4. Metodologija arheološkega dela

4. Methodology of the Archaeological Work

Ivan Turk

Metodologija se deli na terensko in poterensko. Pri tem je jasno, da so izsledki druge odvisni od prve. Zato so pri arheologiji ključne terenske metode. Med drugim tudi zato, ker se njihovi rezultati ne dajo več popraviti ali izboljšati z uporabo drugih metod, kot to lahko storimo pri izsledkih poterenskih metod.

Pri raziskovanju Viktorjevega spodmola sta bili na terenu uporabljeni dve različni metodi.

Prvo metodo, odstranjevanje sedimenta s pomočjo 20–30 cm debelih vodoravnih režnjev in sproten pregled sedimenta pri kopanju in po njem brez sejanja, je uporabil Viktor. To metodo smo uporabljali pri paleolitskih izkopavanjih in sondiranjih z redkimi izboljšavami vse do leta 1986 (Turk 2003).

Drugo metodo, odstranjevanje sedimenta s pomočjo 5 cm debelih vodoravnih režnjev na površini 200 x 20 cm in pregled celotnega sedimenta po izkopavanju s pomočjo mokrega sejanja na sitih z velikostjo luknjic 3 mm in 1 mm (oziroma 0,5 mm) ter z uporabo lupe, smo uporabili na Inštitutu za arheologijo (IzA). To metodo smo uvedli in preizkusili med drugo fazo izkopavanj v Divjih babah I v letih 1990–1999, le da so bili režnji tam debeli 12 cm (Turk 2003), najbolj drobno sito pa je imelo premer luknjic 0,5 mm. Posamezne elemente druge metode je vsebovala tudi metoda izkopavanj mezolitskih najdišč Pod Črmukljo leta 1965 in M. Triglavce leta 1985, kjer so bili sedimenti, ki so vsebovali mezolitske artefakte, suho presejani na sitih z velikostjo luknjic 10 mm in 5 mm in sproti pregledani brez lupe. Debelina režnjev se v nobenem od obeh primerov ne navaja.

Globine režnjev (sl. 5.1) smo v Viktorjevem spodmolu merili z nivelirjem od stalne točke, tako da predstavljajo relativne vrednosti. Tudi na geodetskem posnetku (sl. 3.1), ki smo ga naredili z laserskim teodolitom[1], so pri plastnicah navedene samo relativne višine.

Prednosti in pomanjkljivosti obeh metod bosta nazorno podani v nadaljevanju. Zato smo ločeno, kot dve različni zgodbi istega najdišča, obdelali gradivo Viktorjevega izkopavanja in drugih terenskih faz, ki so bile izključno v pristojnosti Inštituta za arheologijo. Na ta način smo hoteli opozoriti na relativnost rezultatov in

[1] Teodolit nam je posodil Mitja Guštin, za kar se mu lepo zahvaljujemo.

The methodology is divided into fieldwork and post-fieldwork. It is clear that the results of the second depend on the first. So fieldwork methods are crucial in archaeology. Among other things because results can no longer be repaired or improved with the use of other methods, as can be done with the results of post-fieldwork methods. In investigating Viktorjev spodmol, two different methods were used in the field.

The first method, removing the sediment by means of 20–30 cm thick horizontal spits and concurrent examination of the sediments during excavation and afterwards, without sieving, was used by Viktor. This method was used in Palaeolithic excavations and test excavations, with few improvements, until 1986 (Turk 2003).

The second method, removing the sediment by means of 5 cm horizontal spits on an area of 200 x 20 cm and examination of the entire sediments after excavation with the aid of wet sieving on sieves with holes 3 mm and 1 mm (or 0.5 mm) and with the use of a magnifying glass, was used at the Institute of Archaeology (IzA). We introduced and tested this method during the second phase of excavations at Divje babe I in 1990–1999, except that there we used a thickness of spit of 12 cm (Turk 2003), and the finest sieve had a hole diameter of 0.5 mm. The method of excavating the Mesolithic sites Pod Črmukljo in 1965 and M. Triglavca in 1985, contained individual elements of the second method, where sediments containing Mesolithic artefacts were dry sieved on sieves with a size of hole of 10 mm and 5 mm and simultaneously examined without a magnifying glass. The thickness of the spit is not stated in either case.

We measured the depth of spit (Fig. 5.1) in Viktorjev spodmol with a level from a permanent point, so that they represent relative values. In the geodetic record (Fig. 3.1), too, which we made with a laser theodolite[1], only relative heights are stated with the contour lines.

The advantages and disadvantages of the two methods are carefully given below. We thus distinguished the processing of the material of Viktor's excavation, and other fieldwork phases which were exclusively within the competence of the Institute of Archaeology, as

[1] The laser theodolite was loaned by Mitja Guštin, for which we are very grateful.

razlag, ki so odvisni od metode in od tega, kako metodo izvajamo. Rezultati in razlage so med drugim odvisni od reda velikosti napake, ki nastane pri ugotavljanju določenega stanja. Navajanje napake, ki jo dobimo s kontrolo kakovosti lastnega dela, v arheologiji doslej ni bilo običajno, čeprav je nujno za objektivno reševanje arheoloških in drugih vprašanj (glej Turk 2003). To se je pokazalo tudi pri M. Triglavci, kjer se je takratni vodja izkopavanj France Leben pozneje odločil, da dá še enkrat pregledati suho presejane sedimente t. i. mezolitske plasti na enak način kot pri Divjih babah I in Viktorjevem spodmolu. Nalogo je zaupal I. Turku, kar se je bogato obrestovalo.

Poterenske metode so bile bolj ali manj standardne, vendar z nekaj več statistike, kot je običajno, če je bilo to le mogoče. Zaradi skrajno omejenega obsega izkopavanj so bili vzorci različnih najdb majhni in komaj primerni za statistično proučevanje.

Najdbe kamnitih artefaktov sem razdelil na izdelke in odpadke. Oboje sem obravnaval enakovredno, čeprav so odpadki v določenih pogledih manj povedni kot izdelki.

Pri klasifikaciji izdelkov sem uporabil zlasti izkušnje Rozoya (1978a, 1978b), pa tudi drugih avtorjev (G.E.E.M. 1969, 1972, 1975; Lapalace 1964). Namenoma sem se naslonil na tipologije, ki so bile narejene predvsem na gradivu, pridobljenem v najdiščih južno in zahodno od Alp, ker menim, da se vpliv geografske lege v času ne spremninja in da zahodna Slovenija od nekdaj pripada Sredozemlju in sredozemski tradiciji. V primeru tu obravnavanih najdišč to jasno dokazujejo številne najdbe morskih školjk in polžev, ki so značilne za vse sredozemske kulture. Povezovanje zahodne Slovenije s svetovi severno od Alp se mi ne zdi primerno (glej Josipovič 1992 in tam predlagano nemško tipologijo mezolitskih artefaktov).

Za posamezne tipe in skupine kamenih izdelkov ter kamnoseških odpadkov navajam največjo, najmanjšo in povprečno težo. Na podlagi teže sem priložnostno razmejil kline od klinic in druge makrolite od mikrolitov. Meja je ena desetinka grama. Vse, kar je lažje od 0,1 g so klinice oz. mikroliti. Teža je nov kriterij za mikrolitizacijo, saj se sicer kot kriterij uporablja predvsem velikost (prim. Rozoy 1978a, 212 s). Mislim, da so razlike v velikosti in teži mikrolitov po starem kriteriju prevelike, saj so najmanjši mikroliti (t. i. hipermikroliti) tudi do 5-krat manjši in do 20-krat lažji od zgornje dopustne meje za mikrolite, ki je 50 mm za dolžino in 4 mm za debelino oz. 2 g (Rozoy 1980, 11), pri klinicah pa 50 mm za dolžino in 12 mm za širino. Sama meja med mikroliti in makroliti je lahko sporna (Brodar 1992, 27), ker je odvisna od vrste dejavnikov, ki se spreminjajo v času in prostoru. Po mojem kriteriju je praviloma vsaj ena mera klinic in mikrolitov manjša od 3 mm. To pomeni, da se del teh najdb lahko zmuzne skozi sito z velikostjo luknjic 3 mm in več.

two different stories from the same site. We wanted thus to draw attention to the relativity of the results and explanations, which depend on the method and how the method is carried out. The results and explanations depend among other things on the order of size of error that occurs in establishing a specific situation. Stating the error that we obtain with quality control of our own work has not been the custom to date in archaeology, although it is crucial for the objective solution of archaeological and other questions (see Turk 2003). This was also demonstrated with M. Triglavca, where the then leader of the excavations, France Leben, later decided to have the dry sieved sediment, i.e., the Mesolithic layers, examined again in the same way as with Divje babe I and Viktorjev spodmol. The task was entrusted to I. Turk, and it provided rich results.

Post-fieldwork methods were more or less standard, but with some more statistics than is normal, whenever this was possible. Because of the extremely limited extent of excavations, specimens of various finds were very few, and barely adequate for statistical study.

I divided the finds of stone artefacts into products and debris. I treated both the same, although from a certain point of view debris are less valuable than products.

In the classification of products, I used in particular the experience of Rozoy (1978a, 1978b), as well as other authors (G.E.E.M. 1969, 1972, 1975; Lapalace 1964). I deliberately relied on the typologies that had been made mainly on material obtained in sites south and west of the Alps, because I believe that the influence of geographic location does not change over time, and that western Slovenia has long belonged to the Mediterranean and the Mediterranean tradition. In the case of the sites dealt with here, this is clearly shown by the number of finds of marine gastropods and bivalves that are typical of all Mediterranean cultures. Linking western Slovenia with the world north of the Alps does not seem to me to be appropriate (see Josipovič 1992 and the German typology of Mesolithic artefacts proposed there).

For individual types and groups of stone products and stone-working debris, I state the largest, smallest and average weight. On the basis of weight, I arbitrarily divided blades from bladelets, and other macroliths from microliths. The boundary of this is a tenth of a gram. Everything lighter than 0.1 g is a bladelet or microlith. Weight is a new criterion for microlithisation, since size has primarily been used as the criterion (see Rozoy 1978a, 212 p.). I think that the differences in size and weight of microliths according to the old criteria are too great, since the smallest microliths (so-called hypermicroliths) are also up to 5-times smaller and up to 20-times lighter than the upper permissible boundary for microliths, which is 50 mm length and 4 mm thickness or 2 g (Rozoy 1980, 11), and with bladelets 50 mm length and 12 mm width. The boundary itself between micro-

Klasifikacijske težave povzroča velika fragmentarnost vseh kamenih najdb. Zato je napaka pri opredelitvi posameznih skupin kamenih najdb lahko moteča.

Število mikro lusk in odkruškov sem ocenil na podlagi števila in teže mikro lusk in odkruškov v vzorcu ali pa sem jih preštel tako kot vse druge najdbe.

Na podlagi vzorca sem ocenil tudi število kostnih drobcev v frakciji sedimenta 1-3 mm.

Vse druge najdbe sem stehtal in preštel podobno kot kamene artefakte.

Kameni izdelki so bili najprej z obrisavanjem narisani v 6-kratni povečavi s pomočjo stereo mikroskopa, nato pa pomanjšani na 2-kratno in naravno velikost. Ta metoda se je izkazala za najprimernejšo pri risanju mikrolitskih izdelkov.

V tabelah so mikrolitski artefakti prikazani dvakrat: v naravni velikosti in enkrat povečani.

Metodologija, uporabljena pri obdelavi paleontoloških najdb je opisana v ustreznih poglavjih zbornika, zato je tu ne navajam.

VIKTORJEV SPODMOL

liths and macroliths can be disputable (Brodar 1992, 27), because it depends on a range of factors, which change in time and space. According to my criterion, at least one of the measurements of bladelets and microliths is less than 3 mm. This means that part of these finds can slip through a sieve with a diameter of hole of 3 mm or more.

The great fragmentariness of all stone finds cause classification difficulties. So the error in defining individual groups of stone finds can be troublesome.

I estimated the number of microflakes (retouch flakes) on the basis of the number and weight of microflakes and chips in the sample or counted them as with all other finds.

On the basis of the sample, I also estimated the number of bone fragments in the sediment fraction 1-3 mm.

I counted and weighted all other finds, as with stone artefacts.

Stone artefacts were initially drawn in outline increased by a factor of 6 with the help of a stereo-microscope, and then reduced to 2-times and natural size. This method has proved to be the best for drawing microlithic products.

Microlithic artefacts are shown twice in the tables: natural size and twice natural size.

The methodology used in processing palaeontological finds is described in the relevant chapter of this book, so I do not give it here.

5. Stratigrafija in sedimentologija Vikotrjevega spodmola

5. Stratigraphy and Sedimentology of Viktorjev Spodmol

Ivan Turk

Za kraško področje je značilna majhna debelina mezolitskih sedimentov. Ti so tudi drugje redko debelejši od 1 m, kar je razumljivo glede na dolžino trajanja mezolitika. Viktorjev spodmol v tem pogledu ni izjema.

Stratigrafija najdišča je zato enostavna. Nad velikimi podornimi bloki so tri plasti zemlje, pomešane z bloki in drugimi klasti rudistnega apnenca, v katerem se je izoblikoval spodmol. Nad zadnjo od treh plasti je tenka plast umetnega nasutja, ki je domnevno nastala v času Viktorjevega sondiranja, lahko pa tudi kdaj prej (sl. 5.1).

Meje med tremi glavnimi plastmi so zabrisane, tako da celoten profil deluje zelo homogeno. Značilnosti plasti so na podlagi profila in vzorcev sedimentov naslednje:

• Plast 1 in 2 obravnavam kot eno plast, čeprav je bila plast 1 v profilu omejena na eno polovico profila, plast 2 pa je obsegala ves preostali del profila. To je močno zemljata plast s primesjo humusa. V njej je malo debelega grušča in majhnih blokov (10–15 cm). Vsi bloki in grušč so ostrorobi. Slednja ugotovitev velja tudi za vso plast 2 in vso plast 3. Klasti apnenca, večji od 3 mm, so bodisi ostrorobi bodisi korozijsko zaobljeni. Vsi imajo črne obloge. Klasti apnenca, manjši od 3 mm, imajo močne korozijske razjede. Kljub majhni volumenski masi frakcije 1–3 mm je v njej sorazmerno malo agregatov, njihovo vlogo pa so prevzeli številni organski ostanki (kosti, les ipd.). Teh je veliko tudi v frakciji večji od 3 mm. Močno prevladujoča komponenta plasti 1 in 2 je frakcija, manjša od 1 mm, ki predstavlja večinski delež osnove, medtem ko grušč in bloki predstavljajo neizrazit skelet. Frakcija, manjša od 1 mm, prevladuje tudi v globljem delu plasti 2 in v plasti 3, kjer je te frakcije še več kot v plasti 1 in 2. Prav tako je v globljem delu plasti 2 in v plasti 3 več klastov, večjih od 3 mm, več grušča in več blokov (razpredelnica 5.1).

• Plast 2 je sestavljena iz močno zemljenega sedimenta z malo humusa, pomešanega z malo debelega grušča in z majhnimi (10–15 cm) do velikimi bloki (> 15 cm). Blokov je bilo več v spodnjem delu plasti. Glavno komponento predstavlja zemljena osnova. V frakciji 1–3 mm prevladujejo korozijsko zaobljeni klasti apnenca. Poleg teh so še redki, sferoidni in poliedrični agregati, drobci oglja, lesa, lupinic mehkužcev, kosti ... in posamezni alohtoni prodniki. Vsebnost grušča (klasti, večji

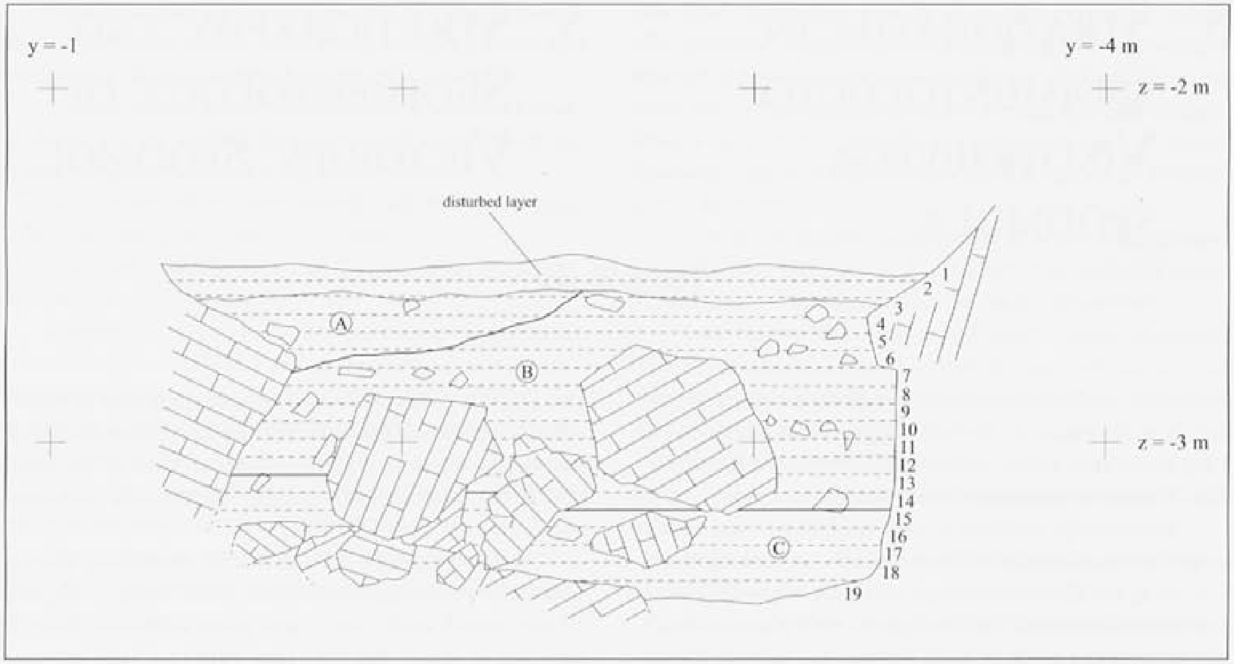
The Karst area is typified by a small thickness of Mesolithic sediments. These are also rarely thicker than 1 m elsewhere, which is understandable in view of the duration of the Mesolithic. Viktorjev spodmol is no exception from this point of view.

The stratigraphy of the site is, therefore, simple. There are three layers of earth above large collapsed blocks, mixed with blocks and other clasts of rudist limestone in which the overhang cave has been created. Above the last of the three layers is a thin layer of artificially redeposited material, presumably created at the time of Viktor's test trench although it could also have been some time previously (Fig. 5.1).

The boundaries between the three main layers are blurred, so that the whole profile appears very homogeneous. On the basis of the profile and sediment samples, the characteristic layers are the following:

• Layers 1 and 2 have been treated as a single layer although in the profile, layer 1 was limited to half of the profile and layer 2 embraced the entire remainder of the profile. This is a strongly earthy layer with an admixture of humus. There is little coarse rubble and small blocks in it (10–15 mm). All blocks and rubble are sharp edged. This last finding also applies for the whole of both layer 2 and layer 3. Limestone clasts larger than 3 mm are either sharp edged or corrosion rounded. All have a black coating. Limestone clasts smaller than 3 mm are strongly corroded. Despite the small volumetric mass of the 1–3 mm fraction, there are relatively few aggregates in it, and their role has been taken by numerous organic remains (bones, wood etc.). There are also a lot of these in the fraction larger than 3 mm. The greatly predominating component of layers 1 and 2 is the fraction smaller than 1 mm, which represents the major share of the matrix while rubble and blocks represent an unremarkable skeleton. The fraction smaller than 1 mm also predominates in the deeper part of layer 2 and in layer 3, where there is even more of this fraction than in layers 1 and 2. Similarly, in the deeper part of layer 2 and in layer 3 there are more clasts larger than 3 mm, more rubble and more blocks (Table 5.1).

• Layer 2 is composed of strongly earthy sediment with little humus, interspersed with a little coarse rubb-



Sl. 5.1: Profil x = + 0,50 m. Vrisani so režnji 1-19 kot osnovne stratigrafske enote. Risal I. Turk.
Fig.5.1: Profile x = + 0.50 m. The spits 1-19 are drawn as the basic stratigraphic unit. Drawn by I. Turk.

od 3 mm) se v spodnjem delu plasti podvoji (razpredelnica 5.1). Grušč postaja z globino vse manj korodiran, vse manj je tudi črnih oblog, dokler ni ves grušč ostrorob in brez črnih oblog. V frakciji, večji od 3 mm, so poleg grušča tudi koščki lesa in kosti. V režnju 12 (gl. -309 cm) so bile najdene kalcitne konkrecije (siga) v obliki cvetače, ki jih razlagam kot avtigene tvorbe.

• Plast 3 je zadnja odkopana plast. Leži na velikem podoru in sega še v pore med podornimi bloki. Vrh podora upada proti severozahodnemu vogalu sonde. Sediment plasti 3 je še vedno močno zemljen, vendar brez primesi humusa. V spodnjem delu plasti je zemlja rahlo ilovnata in rjavo obarvana za razliko od zgornjega dela in drugih plasti, ki so temno sive barve. Blokov in debelega grušča je bilo več v zgornjem kot v spodnjem delu plasti. Glavno sedimentno komponento, če odmislim velike podorne bloke, še vedno predstavlja osnova, ki je sestavljena predvsem iz frakcije, manjše od 1 mm. V frakciji 1-3 mm prevladujejo korozijsko zaobljeni in razjedeni klasti apnenca nad poliedričnimi in poroznimi agregati. Porozni (luknjičavi) agregati so značilni izključno za plast 3. Nekateri agregati vsebujejo tudi drobce oglja. Pri dnu plasti (reženj 19) so bile v tej frakciji tudi kalcitne konkrecije, na katere so se v posameznih primerih prilepili agregati. V frakciji 1-3 mm so poleg klastov, agregatov in konkrecij tudi redki kostni drobci. V frakciji, večji od 3 mm, prevladuje ostrorobi grušč, ki ima pogosto rdeče kalcitne obloge. Poleg grušča so v tej frakciji tudi rdeče obarvane kalcitne konkrecije v obliki cvetače. Oblika konkrecij kaže, da gre za avtigene tvorbe. Frakcije 1-3 mm in frakcije, večje od 3 mm, je v

le and with small (10-15 cm) to large blocks (> 15 cm). There were more blocks in the lower part of the layer. The main component is the earthy matrix. In the 1-3 mm fraction, corrosion rounded limestone clasts predominate. In addition there are occasional spheroid and polyedric aggregates, fragments of charcoal, wood, shells of molluscs, bones etc., and individual allochthonous pebbles. The content of the rubble (clasts larger than 3 mm) is duplicated in the lower part of the layer (Table 5.1). The rubble becomes increasingly less corroded with depth, and there is ever less black coating, until all the rubble is sharp edged and without a black coating. In the fraction larger than 3 mm, in addition to the rubble, there are also bits of wood and bone. In spit 12 (depth -309 cm) calcite concretions (flowstone) were found, in the shape of cauliflowers, which can be explained as autogenic formations.

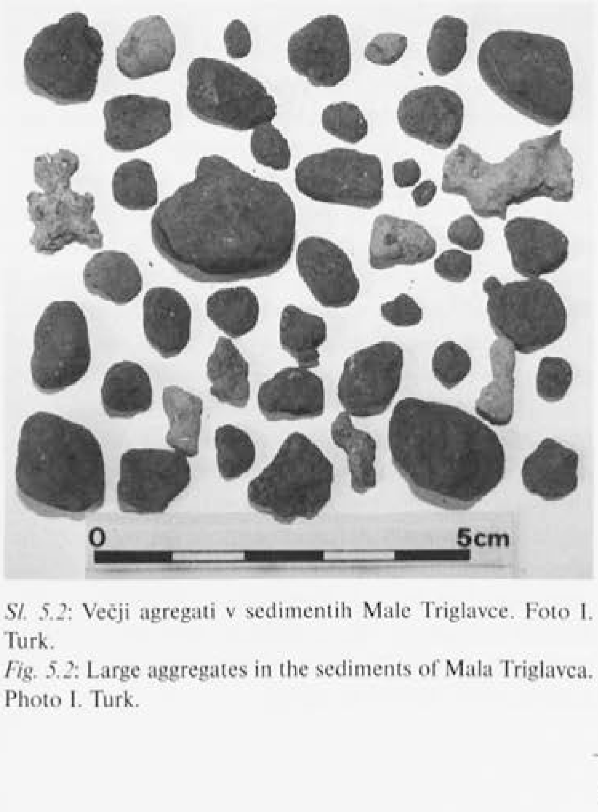
• Layer 3 is the last excavated layer. It lies on a large rockfall and further extends into the spaces between the fallen blocks. The top of the rockfall dips towards the northwest corner of the test trench. The sediment of layer 3 is still strongly earthy but without an admixture of humus. In the lower part of the layer the earth is slightly clayey and brown, in contrast to the upper part and other layers which are dark grey in colour. There were more blocks and coarse rubble in the upper than the lower part of the layer. The main sedimentary component, if we ignore large fallen blocks, is still represented by the matrix, consisting mainly of the fraction smaller than 1 mm. Corrosion rounded and corroded limestone clasts predominate over polyedric plasti 3 nekoliko več kot v krovnih plasteh (razpredelnica 5.1).

Odkopane sedimente je brez pedološko-sedimentološke analize, ki bo morda predmet bodočih, bolj sistemskih raziskav, težko ovrednotiti. Zato se bom omejil na nekaj zelo splošnih hipotetičnih sklepov na podlagi grobe ocene teksture in diageneze sedimentov ter topografske lege najdišča.

Zgornji del profila je manj gruščnat in vsebuje tudi manj blokov kot spodnji del (razpredelnica 5.1). Kaže, da imajo podobno zgradbo tudi holocenski profili v nekaterih jamah in spodmolih na bližnjem Tržaškem krasu (glej Cremonesi *et al.* 1984).

Zaradi pomanjkanja strukturnih agregatov v vseh plasteh profila ne moremo potrditi večje starosti in razvitosti tal, ki so nastala na robu spodmola ali bila tja presedimentirana s pobočja nad spodmolom. Svoje pove tudi velikost agregatov, ki nikjer v profilu ne preseže 3 mm. V mezolitski plasti M. Triglavce so strukturni agregati precej večji in tudi pogostejši (sl. 5.2.). Podobno velja za nekatera mezolitska jamska najdišča na Tržaškem krasu (Cremonesi *et al.* 1984).

Volumenska masa peščene frakcije sedimenta, ki je med drugim odvisna predvsem od količine agregatov, ki je lahko dober kazalec vlažne klime (Turk *et al.* 2002), se v profilu giblje med 0,98 g/cm^3 in 1,18 g/cm^3 (razpredelnica 5.1). V M. Triglavci ima peščena frakcija volumensko maso 0,87 g/cm^3, kar se ujema z večjim številom strukturnih agregatov v sedimentu. V pleistocenskih plasteh Divjih bab I je volumenska masa peščene frakcije 0,82-1,54 g/cm^3. Holocenska plast v Divjih ba-



Sl. 5.2: Večji agregati v sedimentih Male Triglavce. Foto I. Turk.

Fig. 5.2: Large aggregates in the sediments of Mala Triglavca. Photo I. Turk.

and porous aggregates in the fraction 1-3 mm. The porous (perforated) aggregates are characteristic exclusively of layer 3. Some of the aggregates also contain fragments of charcoal. On the floor of the layer (spit 19) there were also calcite concretions in this fraction, to which in individual cases aggregates were attached. In the 1-3 mm fraction, in addition to clasts, aggregates and concretions, there were also occasional bone fragments. In the fraction larger than 3 mm, sharp edged rubble predominates, which often has a red calcite covering. In addition to the rubble there are also red calcite concretions in the shape of cauliflowers in this fraction. The shape of the concretions shows that they are an autogenic creation. There are rather more of the 1-3 mm fraction and the fraction larger than 3 mm in layer 3 than in the covering layers (Table 5.1).

Without a pedological-sedimentological analysis, which will perhaps be the subject of future, more systematic research, it is difficult to evaluate the excavated sediment. I will therefore restrict myself to some very general hypothetical conclusions on the basis of a rough assessment of the texture and diagenesis of the sediments and the topographic position of the site.

The upper part of the profile is less gravelly and also contains fewer blocks than the lower part (Table 5.1). It appears that Holocene profiles in some caves and overhang caves in the nearby Triestine Karst have a similar texture (see Cremonesi et al. 1984).

Because of the lack of structural aggregates in all layers of the profile, we cannot confirm a greater age and level of development of the soil created at the edge of the overhang cave or re-sedimented there from the area above the overhang. The size of the aggregates, which do not exceed 3 mm anywhere in the profile, also tells its own tale. In the Mesolithic layer of M. Triglavca, the structural aggregates are considerably larger and also more frequent (Fig. 5.2.), as in some Mesolithic cave sites on the Triestine Karst (Cremonesi et al. 1984).

The volumetric weight of the sand fraction, which among other things depends on the quantity of aggregates, which can be a good indicator of a damp climate (Turk et al. 2002), ranges in the profile between 0.98 g/cm^3 and 1.18 g/cm^3 (Table 5.1). In M. Triglavca, the sand fraction has a volumetric weight of 0.87 g/cm^3, which corresponds to the larger number of structural aggregates in the sediment. In the Pleistocene layers of Divje babe I, the volumetric weight of the sand fraction is 0.82-1.54 g/cm^3. The Holocene layer of Divje babe I, which contains prehistoric and other pottery, has a volumetric weight of the sand fraction of 1.09 g/cm^3.

In the whole profile of Viktorjev spodmol, there are at least two, poorly developed accumulation horizons. The first is in the lower part of layer 2 (depth -309 cm), and the other on the bottom of layer 3 (depth -334 to -353 cm). Both are characterised by a calcite covering

Razpredelnica 5.1: Zgradba sedimenta Viktorjevega spodmola.
Table 5.1: Texture of sediments of Viktorjev spodmol.

Globina Depth (cm)	Plast Layer	Debel grušč, bloki Coarse gravel, blocks (kosov / count)	Pregledan sediment Sampled sediment (litrov / litres)	Frakcija > 3 mm Fraction >3 mm (kg)	Frakcija >3 mm Fraction > 3 mm (uteženo litrov) (weighted litres)	Frakcija 1-3 mm Fraction 1-3 mm (kg)	Frakcija 1-3 mm Fraction 1-3 mm (uteženo litrov) (weigted litres)	Frakcija 1-3 mm Fraction 1-3 mm Volumenska masa Volumetric mass (kg/l - kg/litre)
254	nasutje	0	20	0,38	0,38	0,18	0,18	1,00
259	disturb.	21	60	0,99	0,33	0,48	0,16	0,98
264		30	80	0,88	0,22	0,43	0,11	
269	1 in 2 1 and 2	53	80	1,1	0,28	0,44	0,11	1,05
274		102	80	1,72	0,43	0,52	0,13	
279		46	80	2,19	0,55	0,63	0,16	1,09
284		60	80	2,16	0,54	0,79	0,20	
289		59	80	1,56	0,39	0,7	0,18	1,18
294		77	60	1,35	0,45	0,56	0,19	
299	2	117	60	1,82	0,61	0,68	0,23	1,14
304		137	60	2,1	0,70	0,65	0,22	
309		138	60	2,35	0,78	0,8	0,27	1,11
314		145	70	3,43	0,98	1,07	0,31	
319		119	60	3,19	1,06	1,03	0,34	1,10
324		142	70	3,48	0,99	1,04	0,30	
329		142	60	3,17	1,06	1	0,33	1,11
334	3	114	60	3,69	1,23	1,06	0,35	
339		116	30	2,14	1,43	0,82	0,55	1,17
353		50	20	1,75	1,75	0,46	0,46	1,09
99	**3**	**1668**	**1170**	**39,45**		**13,34**		

bah I, ki vsebuje prazgodovinsko in drugo keramiko, ima volumensko maso peščene frakcije 1,09 g/cm^3.

V celotnem profilu Viktorjevega spodmola sta vsaj dva, slabo razvita akumulacijska horizonta. Prvi je v spodnjem delu plasti 2 (gl. 309 cm), drugi pa v dnu plasti 3 (gl. 334-353 cm). Za oba so značilne kalcitne prevleke na klastih in arheoloških najdbah ter kalcitne konkrecije. V plasti 1 in 2 so samo težko odstranljive "blatne" prevleke, ki glede na temno sivo barvo vsebujejo precej organske snovi (morda humusa).

Spodnji del plasti 2 in celotna plast 3 sta genetska mešanica regosola, ki sodi v kategorijo nerazvitih tal, in koluvijuma (materiala spranega s pobočja nad spodmolom). Za regosol se sicer zahteva podlaga z zrnasto teksturo, kar pa rudistni apnenec ni, vendar zrnavost do neke mere nadomeščajo klasti, ki so nastali z razpadanjem spodmola in podornih blokov, ki so predstavljali 'substrat' plasti 3. Zaradi počasne sedimentacije se je s časom mineraliziral ves humus, ki ga je v regosolu že tako manj kot 1 %, v koluvialnih tleh pa ga je tudi malo (Ćirić 1986). To je lahko pomembna ugotovitev, saj so v tej zemlji mezolitske najdbe, ki so v bližnjem najdišču Pod Črmukljo sicer v humusu (Brodar 1992). Humus se pri tem razlaga kot značilen holocenski sediment, kar avtomatično določa starost najdb in časovno mejo med mezolitikom in paleolitikom po pravilu, da v pleistocen-

on clasts and archaeological finds and calcite concretions. In layers 1 and 2, there are "mud" coatings that are difficult to remove, and in view of the dark grey colour contain considerable amounts of organic substances (perhaps humus).

The lower part of layer 2 and the whole of layer 3 are genetically mixed regosols, which are in the category of undeveloped soils, and colluvium (material washed from the slopes above the overhang cave). Regosols require a substrate of grainy texture, which rudist limestone is not, but the graininess is to some extent replaced by clasts created with the collapse of the overhang and fallen blocks that represent the "substrate" of layer 3. Because of the slow sedimentation, all the humus was mineralised, being already less than 1% in the regosol, and in the colluvial soil there is also only a little (Ćirić 1986). This may be an important finding, since the Mesolithic finds, which in the nearby site of Pod Črmukljo are in humus, are in these soils (Brodar 1992). Humus is thus explained as a typical Holocene sediment, which automatically defines the age of the finds and the temporal boundary between the Mesolithic and Palaeolithic based on the rule that there is no humus in Pleistocene sediments. This is certainly true, but Holocene cave sediments without humus also exist (see Cremonesi et al. 1984; Turk et al. 1993).

skih sedimentih ni humusa. Zadnje popolnoma drži. Vendar obstajajo tudi holocenski jamski sedimenti brez humusa (glej Cremonesi *et al.* 1984; Turk *et al.* 1993).

Plast 1 in 2 ter zgornji del plasti 2 so genetska mešanica rendzine in koluvijuma. Zaradi hitrejše sedimentacije vsebujejo več humusa, ki se je zunaj horizonta A (vrh profila) ohranil v pogrebenih tleh oziroma se je s pomočjo bioturbacije dodajal v globlje horizonte. V tej zemlji je bila večina keramičnih najdb, ki so bistveno mlajše od mezolitskih ostankov. Zato lahko predvidevam med eno in drugo vrsto zemlje precejšnjo sedimentacijsko vrzel.

Keramični drobci, najdeni v plasti 1 in 2 ter v zgornjem delu plasti 2, so bili vsi močno zaobljeni, kar nakazuje izdatno premikanje v obdobju pred dokončno vključitvijo v sediment.

Iz pedološkega vidika je zaradi verjetne prekinitve profil zelo zapleten, tako da bi ga lahko uvrstil tudi v skupino poligenetskih tal (Ćirić 1986).

Layers 1 and 2 and the upper part of layer 2 are genetically mixed rendzinas and colluvium. Because of the faster sedimentation, they contain more humus, which outside horizon A (top of the profile) has been preserved in buried soil or has been added to deeper horizons by means of bioturbation. The majority of pottery finds, which are essentially more recent than the Mesolithic remains, were in this soil. So we can envisage a considerable sedimentational gap between the two types of soil.

Pottery fragments found in layers 1 and 2 and in the upper part of layer 2 were all strongly rounded, which indicates substantial movement in the period prior to final inclusion in the sediments.

From a pedological point of view, the profile is very complex because of the probable sedimentation gap, so that it could also be classified in the group of polygenetic soils (Ćirić 1986).

6. Različne arheološke metode – različni rezultati pri raziskavah Viktorjevega spodmola

6. Different Archaeological Metods – Different Results in Investigations of Viktorjev Spodmol

Ivan Turk

Ker smo pri arheoloških raziskavah Viktorjevega spodmola uporabili različne metode, se je ponudila idealna priložnost, da te metode ovrednotim in nazorno pokažem, kako tudi v arheologiji metoda vpliva na rezultat. To je seveda splošno znano, vendar se mi dozdeva, da se tega v arheologiji premalo zavedamo in da na to kaj radi pozabimo pri analizi drobnih arheoloških in drugih najdb (glej Payne 1972 b).

Terenske raziskave v Viktorjevem spodmolu so potekale v treh fazah, ki sem jih imenoval faza Viktor, faza Viktor in IzA ter faza IzA. **Faza Viktor** predstavlja izsledke in razlago Viktorjevega sondiranja. **Faza Viktor in IzA** predstavlja izsledke in razlago ponovnega pregledovanja sedimenta iz Viktorjeve sonde, potem ko smo ves sediment sprali in presejali skozi sita. **Faza IzA** predstavlja izsledke in razlago stratigrafskega izkopavanja profila Viktorjeve sonde.

6.1 Arheološke najdbe iz Viktorjeve sonde (faza Viktor)

(razpredelnice 6.1.1-6.1.4; sl. 6.1.1; t. 1-2)

Viktor ni beležil globin, na katerih so ležale posamezne najdbe, in je vse odkopane sedimente in najdbe v sondi veliki, 1 x 2 x 1 m, razdelil v dve stratigrafski enoti (sl. 6.1.1): zgornjo in spodnjo plast, pri čemer je meja potekala nekako po sredini celotne višine profila.

Za zgornjo plast je bila značilna prisotnost prazgodovinske keramike (37 odlomkov ali 0,81 kg), spodnja plast pa je bila brez nje. V obeh plasteh so bili kamniti artefakti.

V zgornji plasti smo našli en sam retuširan odbitek, in še ta le z uporabno retušo, 6 jeder in 62 odpadkov (razpredelnica 6.1:1-6.1.2). Poleg tega sta bila tu še dva brusa iz peščenjaka.

V spodnji plasti je bilo 5 praskal, en retuširan odbitek, 2 odbitka s prečno retušo, 11 jeder in 85 odpadkov (razpredelnica 6.1.1-6.1.2). Poleg tega smo našli še en brus in dva odlomljena jelenova parožka, od katerih je bil eden oblikovan v šilo.

Since various methods were used in the archaeological investigation of Viktorjev spodmol, it is an ideal opportunity to evaluate these methods and show clearly how in archaeology, too, the method affects the result. This is, of course, generally known, but it seems to me that we are too little aware of it in archaeology and that we tend to forget it in the analysis of small archaeological and other finds (see Payne 1972 b).

Investigations in the field at Viktorjev spodmol took place in three phases, which I have called the Viktor Phase, the Viktor and IzA Phase, and the IzA Phase. **Viktor Phase** represents the results and interpretations of Viktor's test trench. **Viktor and IzA Phase** represents the results and interpretations of a re-examination of the sediments from Viktor's test trench, when all the sediments were washed and sieved. The **IzA Phase** is the results and interpretations of the stratigraphic excavations of the profile of Viktor's test trench.

6.1 Archaeological Finds from Viktor's Test Trench (Viktor Phase)

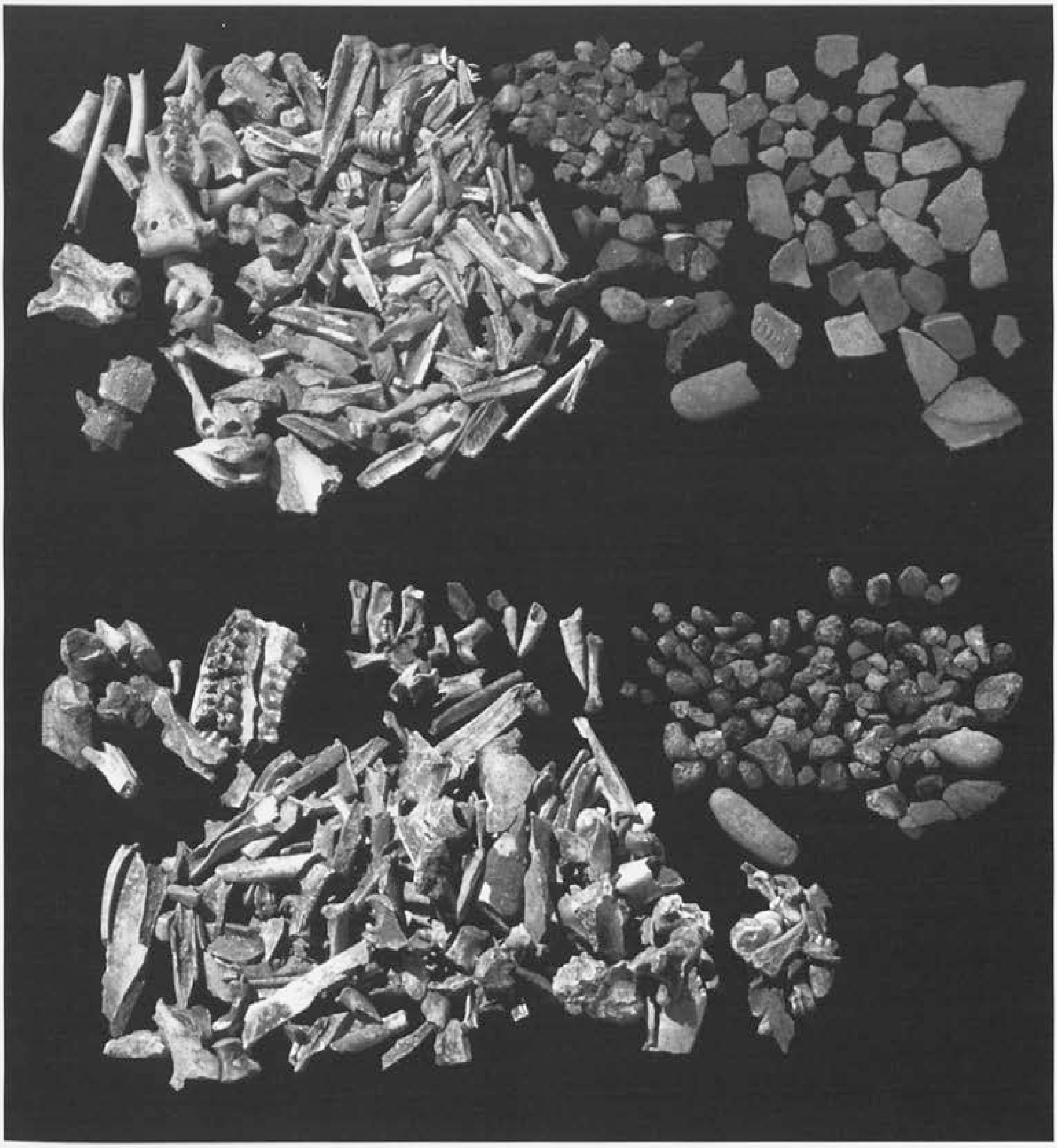
(Tables 6.1.1-6.1.4; Fig. 6.1.1; Plates 1-2)

Viktor did not record the depth at which individual finds lay, and divided all the excavated sediments and finds in the test trench, 1 x 2 x 1 m, into two stratigraphic units (Fig. 6.1.1): the upper and lower layer, whereby the boundary is roughly along the centre of the total depth of the profile.

The presence of fragments of pre-historic pottery (37 fragments or 0.81 kg) is characteristic of the upper layer, and the lower layer was without them. There were stone artefacts in both layers.

In the upper layer, we found only one retouched flake, with use wear, 6 cores and 62 items of debris (Table 6.1.1-6.1.2). In addition, there were two sandstone whetstones here.

In the lower layer, there were 5 endscrapers, one retouched flake, 2 truncated flakes, 11 cores and 85 items of debris (Table 6.1.1-6.1.2). In addition, we found an-



Sl. 6.1.1: Vse arheološke in paleontološke najdbe iz Viktorjeve sonde: zgornja in spodnja plast. Foto I. Turk.
Fig. 6.1.1: All archaeological and palaeontological finds from Viktor's test trench: upper and lower layers: Photo I. Turk.

Zgornja plast je vsebovala nekaj zanimivih, majhnih jeder (t. 1: 1), ki so specificirana v razpredelnici 6.1.4. Med odpadki so prevladovale razbitine in odbitki s korteksom, tj. deli prodnikov (razpredelnica 6.3). Na dveh odbitkih s korteksom so bili negativi, nastali pri oblikovanju predhodnih jeder ali prenukleusov (t. 2: 11-12). Med odpadom sta bili tudi dve neretuširani klini, ena cela in en srednji del kline z odlomljeno bazo in koncem.

Spodnja plast je dala več gradiva. Predvsem so bila v njej 4 cela in eno fragmentirano praskalo na odbitku,

other whetstone and two broken-off prongs of deer antler, one of which had been shaped into an awl, or borer.

The upper layer contained some interesting, small cores (Plate 1: 1), which are specified in Table 6.1.4. Shatter fragments and cortical flakes prevailed among the debris, i.e., parts of pebbles (Table 6.3). On two cortical flakes there were removal scars, created during the making of pre-nucleuses (Plate 2: 11-12). The debris also included two unretouched blades, one whole, and one the medial part of a blade with broken base and tip.

od katerih je eno na retuširanem odbitku (t. 2: 17). Dalje sta bila tam en retuširan odbitek oz. kratka klina s prečno, rahlo vbočeno retušo in en odbitek s prečno, rahlo vbočeno retušo (t. 2: 19). Potem je bilo tam več zanimivih majhnih jeder in njihovih odlomkov (t. 1: 2, 4, 5; 2: 10; razpredelnica 6.1.4). V odpadu (razpredelnica 6.1.2) so še vedno prevladovale razbitine in odbitki s korteksom. Med odpadki je bilo tudi 9 neretuširanih klin, od katerih so bile nekatere tako majhne, da bi bile lahko že klinice. Ena klina je bila cela, 2 skoraj celi, 3 so imele ohranjen samo bazalni del, 3 samo srednji del in ena samo končni del. Drugi deli so bili odlomljeni. V spodnji plasti so bili tako redki izdelki kot odpadki krakelirani.

Viktorjev nabor najdb je omogočal nekaj sklepov.

Jedra in odpadni kosi s korteksom so kazali na *in situ* proizvodnjo kamenih izdelkov. Prav tako jedra, razbitine in odbitki s korteksom. Prodniki so bili lokalnega izvora, iz naplavin reke Reke ali iz izdankov kamnin v njenem zgornjem toku, ki vsebujejo kremenove prodnike.

Krakelirani izdelki in odpadki so bili bodisi posledica zmrzovanja bodisi termične obdelave kremena v procesu izdelave izdelkov in polizdelkov.

Kamene najdbe iz Viktorjeve sonde se niso dale zanesljivo časovno opredeliti. Zgornja plast z najdbami keramike je kazala največ eneolitsko starost, če izhajamo iz predpostavke, da sta obe vrsti najdb sočasni, ker se nahajata v isti plasti. Spodnja plast, ki je bila brez keramike, bi bila lahko, glede na veliko podobnost sedimentov obeh plasti in majhno razliko v globini kvečjemu nekoliko starejša od zgornje plasti. Najdbe same niso dokazovale zanesljivo večje razlike v starosti obeh plas-

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The lower layer gave more material. Above all, in it were 4 whole and one fragmented endscrapers on flakes, one of which on a retouched flake (Plate 2: 17). Furthermore, there were one retouched flake or short blade with slightly concave truncation and a flake with slightly concave truncation (Plate 2: 19). There were also a number of interesting small cores and flakes from them (Plates 1: 2, 4, 5; 2: 10; Table 6.1.4). Shatter fragments and cortical flakes still predominate in the debris (Table 6.1.2). Among the debris were also 9 unretouched blades, some of which were so small that they could already be considered bladelets. One blade was whole, two almost whole, 3 had only the proximal part preserved, 3 only the medial part and one only the terminal part. Other parts were fractured. There were both artefacts and debris in the lower layer, occasionally thermally cracked.

Viktor's collection of finds enabled some conclusions.

Cores, shatter fragments and cortical pieces of debris indicated the *in situ* production of stone artefacts. The pebbles were of local origin, from the alluvial deposits of the river Reka or from outcrops of conglomerate in its upper course, which contain chert pebbles.

Thermally affected products and debris were a result either of freezing or the thermal processing of the chert in the process of making the products and semi-products.

The stone finds from Viktor's test trench could not be reliably determined temporally. The upper layer with the finds of pottery indicated at most Eneolithic age, if we accept the premise that both types of find are contemporary because they were located in the same layer.

Razpredelnica 6.1.1: Viktorjev spodmol, sonda: specifikacija izdelkov.
Table 6.1.1: Viktorjev spodmol, test trench: specification of products.

Globina Depth (cm)	Plasti Layers	Praskala na odbitku Endscrapers on flake				Odbitki retuširani Retouched flakes		Odbitki s prečno retušo Truncated flakes	
		Kosov Count	Teža (g) Weight (g)	g max	g min	Kosov Count	Teža (g) Weight (g)	Kosov Count	Teža (g) Weight (g)
300	Zgornje Upper	0	0	0	0	1	3	0	0
360	Spodnje Lower	5	9,2	4,2	0,7	1	14,4	2	1,3; 1,5
110	Združene All	**5**	9,2	4,2	0,7	**2**	17,4	**2**	2,8

Razpredelnica 6.1.2: Viktorjev spodmol, sonda: odpad.
Table 6.1.2: Viktorjev spodmol, test trench: debris.

Globina Depth (cm)	Plasti Layers	Odpadki < 3 mm Debris < 3 mm			Odpadki > 3 mm Debris > 3 mm					Jedra Cores					SKUPAJ TOTAL
		Kosov Count	Teža (g) Weight (g)	g/kos g/piece	Kosov Count	Teža (g) Weight (g)	g/kos g/piece	g max	g min	Kosov Count	Teža (g) Weight (g)	g/kos g/piece	g max	g min	Kosov Pieces
300	Zgornje Upper	0	0	0	62	678,5	2,49	137	0,4	6	49	8,17	19,3	3,9	68
360	Spodnje Lower	0	0	0	85	489,8	2,42	139	0,1	11	65	9,85	8,3	3,1	96
110	Združene All	0	0	0	**147**	1168,3	7,95	139	0,1	**17**	114	6,71	19,3	3,1	**164**

Razpredelnica 6.1.3: Viktorjev spodmol, sonda: specifikacija odpada > 3 mm.
Table 6.1.3: Viktorjev spodmol, test trench: specification of debris > 3 mm.

Globina Depth (cm)	Plasti Layers	Razbitine* Shatter fragments*						Odbitki navadni Non-cortical flakes				
		Kosov brez korteksa Count non-cortical	Kosov s korteksom Count cortical	Teža (g) Weight (g)	g/kos g/piece	g max	g min	Kosov Count	Teža (g) Weight (g)	g/kos g/piece	g max	g min
300	Zgornje Upper	6	22	598,7	99,78	137	1,3	9	13,3	1,48	2,9	0,4
360	Spodnje Lower	1	10	312,7	4,70	139	2,6	22	41,3	1,88	7,5	0,2
110	Združene All	**7**	**32**	911,4	23,37	139	1,3	**31**	54,6	1,76	7,5	0,2

nadaljevanje / continuation

Globina Depth (cm)	Plasti Layers	Odbitki s korteksom Cortical flakes					Odbitki laminarni Laminar flakes				
		Kosov Count	Teža (g) Weight (g)	g/kos g/piece	g max	g min	Kosov Count	Teža (g) Weight (g)	g/kos g/piece	g max	g min
300	Zgornje Upper	21	61,2	2,91	8,2	0,4	2	3	1,50	2,4	0,6
360	Spodnje Lower	40	124	3,10	13,5	0,4	3	7,4	2,47	4	1,2
110	Združene All	**61**	185,2	6,01	13,5	0,4	**5**	10,4	2,08	4	0,6

nadaljevanje / continuation

Globina Depth (cm)	Plasti Layers	Kline neretuširane Unretouched blades					Klinice neretuširane Unretouched bladelets					SKUPAJ TOTAL
		Kosov Count	Teža (g) Weight (g)	g/kos g/piece	g max	g min	Kosov Count	Teža (g) Weight (g)	g/kos g/piece	g max	g min	Kosov Pieces
300	Zgornje Upper	2	2,3	1,15	1,3	1	0	0	0	0	0	40
360	Spodnje Lower	10	4,4	0,44	1,3	0,1	0	0	0	0	0	76
110	Združene All	**12**	6,7	0,56	1,3	0,1	**0**	0	0	0	0	**148**

* V tej kategoriji so tudi testirani prodniki. / This category includes also tested pebbles.

Razpredelnica 6.1.4: Viktorjev spodmol, sonda: specifikacija jeder.
Table 6.1.4: Viktorjev spodmol, test trench: specification of cores.

Globina Depth (cm)	Plasti Layers	Jedra Cores							
		Neizoblikovana Amorphous	Teža (g) Weight (g)	Enopolarna Unidirectional	Teža (g) Weight (g)	Piramidalna Pyramidal	Teža (g) Weight (g)	Prizmatična Prismatic	Teža (g) Weight (g)
300	Zgornje Upper	1	3,9	1	6,5	1	19,3	1	7,1
360	Spodnje Lower	3	8,3; 3,7; 3,1	0	0	2	5,5; 5,4	0	0
110	Združene All	**4**	19	**1**	6,5	**3**	30,2	**1**	7,1

nadaljevanje / continuation

Globina Depth (cm)	Plasti Layers	Jedra Cores							
		Navzkrižna With crossed blank removals	Teža (g) Weight (g)	Kroglasta Spherical	Teža (g) Weight (g)	Diskasta Discoidal	Teža (g) Weight (g)	Posebna* Various*	Teža (g) Weight (g)
300	Zgornje Upper	0	0	0	0	0	0	2	8,2; 4
360	Spodnje Lower	1-2	6,9; 6,6	0	0	1	6,5	3	8,3; 8,4; 2,3
110	Združene All	**2**	13,5	**0**	0	**1**	6,5	**5**	31,2

* Med posebnimi jedri so: eno jedro na odbitku, eno "bifacialno" jedro in 3 fragmenti jeder (od tega en fragment prizmatičnega kotnega jedra). / "Various" includes: one flake core, one "bifacial" core and 3 core fragments (including one prismatic core fragment).

ti. Razlaga najdb je tako ostala problematična, prav tako povezovanje z drugimi najdišči.

6.2 Arheološke najdbe v ponovno pregledanem sedimentu Viktorjeve sonde (faza Viktor in IzA)

(razpredelnica 6.2.1–6.2.7; sl. 6.2.1; t. 2–4, 7)

Kamene in druge najdbe, zbrane pri ponovnem pregledu že pregledanih sedimentov, niso stratificirane. Zato sem jih obravnaval kot celoto, pri čemer sem izgubil pomemben del informacije.

Med kamenimi izdelki so zastopani naslednji značilni kosi: 6 praskal na odbitku, 8 retuširanih odbitkov, 8 retuširanih klin, 3 odbitki s prečno retušo, 2 klini s prečno retušo, 2 klini z izjedo, 1 kljun, 1 trapez, 30 retuširanih klinic, 12 mikro konic, 22 trikotnikov, 15 fragmentov makrolitov, 3 fragmenti mikrolitov in 10 tehnološko zanimivih odpadkov (sl. 6.2.1) (razpredelnica 6.2.1).

Praskala so, razen enega (t. 2: 16), precej površno izdelana in komaj zaslužijo to ime. Med njimi je eno na retuširanem odbitku in eno fragmentirano in močno poškodovano v ognju.

Med **retuširanimi odbitki** je 5 fragmentov, od katerih ima po eden strmo, polstrmo in stopnjevito retušo. Poleg omenjenih vrst retuš je prisotna še uporabna retuša.

Retuširane kline so bile vse razen ene fragmentirane. Štirje fragmenti so pripadali bazi, eden sredini in dva nedoločenemu delu kline. Retuša je uporabna, polstrma in strma. Dva primerka imata plitke izjede, ki v enem primeru dajejo vtis nazobčanosti.

Odbitki s prečno retušo niso najbolj prepričljivi. Med njimi sta dva mikrolitska primerka in en retuširan odbitek z vbočeno prečno retušo.

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The lower layer, which was without pottery, could be at most slightly older than the upper layer in view of the great similarity of the sediments of the two layers and small difference in depth. The finds themselves do not reliably prove greater difference in the age of the two layers. Interpretation of the finds thus remains problematic, as does linking with other sites.

6.2 Archaeological Finds in the Re-examined Sediments of Viktor's Test Trench (Viktor and IzA Phase)

(Tables 6.2.1–6.2.7; Fig. 6.2.1; Plates 2–4, 7)

Stone and other finds collected during the re-examination of the already examined sediments were not stratified. I have therefore treated them as a whole, by which I have lost an important part of the information.

The following characteristic pieces are represented among the stone products: 6 endscapers on flakes, 8 retouched flakes, 8 retouched blades, 3 truncated flakes, 2 truncated blades, 2 notched blades, 1 bec, 1 trapeze, 30 retouched bladelets, 12 micropoints, 22 triangles, 15 fragments of macroliths, 3 fragments of microliths and 10 technologically interesting items of debris (Fig. 6.2.1) (Table 6.2.1).

Endscrapers, with the exception of one (Plate 2: 16), are fairly superficially worked and barely deserve the name. They include one on a retouched flake and one fragmented and powerfully damaged in a fire.

Among the **retouched flakes** there are 5 fragments, of which one each has abrupt, semi-abrupt and stepped retouch. In addition to the aforementioned types of retouch, there is also use wear present.

The **retouched blades** were all fragmented except

Razpredelnica 6.2.1: Viktorjev spodmol, sonda: specifikacija izdelkov.
Table 6.2.1: Viktorjev spodmol, test trench: specification of products.

Praskala na odbitku Enscrapers on flake					Odbitki retuširani Retouched flakes					Kline retuširane Retouched blades				
Kosov Count	Teža (g) Weight (g)	g/kos g/piece	g max	g min	Kosov Count	Teža (g) Weight (g)	g/kos g/piece	g max	g min	Kosov Count	Teža (g) Weight (g)	g/kos g/piece	g max	g min
6	9,6	1,60	2,5	0,8	**8**	9,1	1,14	2,4	0,1	**8**	4,6	0,58	1,5	0,1

nadaljevanje continuation

Odbitki s prečno retušo Truncated flakes		Kline s prečno retušo Truncated blades		Kline z izjedo Notched blades		Kljun Bec		Makroliti fragmenti Macroliths fragments
Kosov Count	Teža (g) Weight (g)	Kosov Count	Teža (g) Weight (g)	Kosov Count	Teža (g) Weight (g)	Kosov Count	Teža (g) Weight (g)	
3	0,6	**2**	0,3	**2**	0,5	**1**	1,1	**15**

nadaljevanje continuation

Klinice* Retuširane Retouched bladelets*	Mikro konice* Micro points*	Trikotniki* Triangles		Mikroliti* fragmenti Microliths* fragments	Trapezi Trapezes		Mikro Vbadala Microburins	Tehnični primerki Technological pieces
		Raznostran. Scalene	Enakokr. Isocele		Kosov Count	Teža (g) Weight (g)		
30	**12**	**22**	**0**	**3**	**1**	0,6	**9**	**1**

* Teža posameznega kosa je < 0,1 g, razen redkih izjem. / Weight of single piece is < 0.1 g excluding some exceptions.

Sl. 6.2.1: Izbor mikrolitskih izdelkov, najdenih pri ponovnem pregledu sedimentov iz Viktorjeve sonde. Zadnji v tretjem stolpcu je odlomek klinice s hrbtom iz kamene strele. Merilo je podano v cm. Foto F. Stele.

Fig. 6.2.1: Selection of microlith products found during re-examination of sediments from Viktor's test trench: The last item in the third column is a fragment of a backed blade from rock crystal. Measurements are in cm. Photo F. Stele.

Klini s prečno retušo sta dve, obe fragmentirani. Sta zelo tanki in imata ravne vse robove, s prečno retuširanim robom vred. Zato ni izključeno, da fragmenta ne bi pripadala trapezom, ki so bili narejeni z enostavnim lomljenjem klin brez mikrovbadalne tehnike, tj. lomljenja s pomočjo izjede.

Izrazito **izjedo** imata dva fragmenta retuširanih klin.

Kljun je en sam na odbitku. Narejen je s kombinacijo prečne retuše in izjede (t. 2: 23).

Prav tako je en sam **trapez**, ki je bil narejen na klini s pomočjo dveh zelo globokih izjed (t. 2: 20). Težko je presoditi, ali gre za mikrovbadalno tehniko izdelave ali ne, saj ni ostankov prelomnih ploskev.

for one. Four fragments belong to the proximal, one to the medial and two to undetermined parts of the blade. Retouch is from use, semi-abrupt and abrupt. Two examples have shallow notches, which in one case gives a denticulate impression.

The **truncated flakes** are not very convincing. There are two microlith examples among them and one retouched flake with a concave truncation.

There are two **truncated blades,** both fragmented. They are very thin and all edges are straight. It cannot therefore be excluded that the fragments belong to trapezes which were made from a simple fractured blade with no use of microburin technique, i.e., fracturing with the aid of a notch.

Two fragments of retouched blades have a pronounced **notch**.

There is only one **bec** on a flake. It is made with a combination of truncation and notch (Plate 2: 23).

Similarly, there is only one **trapeze**, which was made on a blade with the aid of two very deep notches (Plate 2: 20). It is hard to judge whether this is a microburin technique of production or not, since there are no remains of fracture surfaces.

The microliths are the most important part of the finds; bladelets, points and triangles.

Among microliths, **bladelets** are most represented (Plate 2: 24, 27-31). Fragments of various parts of bladelets predominate, which are variously retouched (Table 6.2.2). Some end fragments are similar to triangles and could be unfinished examples of them. Proximal fragments of **stemmed bladelets** (Plate 3: 32-36) are also interesting, which must have been helved. A hypermicrolithic medial fragment of a bladelet (or point) needs special mention, being the smallest product found at the site (Plate 2: 22). With such and even smaller tools, they drilled micro beads, which are known from Mesolithic layers in M. Triglavca and from other sites (see Part 2 of this volume).

Of the **micropoints**, 2 are whole, 6 fragments belong to the proximal part, 2 to the medial and 2 to the termination of the point (Plate 4: 59-68). Since the base was also pointed with bipoints, it is difficult to judge with the fragments which end of the point we are dealing with. Micropoints are characterised by an abrupt retouch, exceptionally a semi-abrupt retouch on both edges converging towards the tip of the point. In one case, only one abruptly retouched edge ends with a point. Bipoint micropoints are very similar to Sauveterrian points (*pointe de Sauveterre*).

Microlithic **triangles** *sensu lato* are the most characteristic element of the Mesolithic stone inventory (Plates 3: 37-50; 4: 52-58; Table 6.2.3). They unite both real triangles and backed truncated bladelets, and in size and shape approximate to real triangles. Since many of the specimens are fragmented, there is a danger that I

Razpredelnica 6.2.2: Viktorjev spodmol, sonda: specifikacija retuširanih klinic.
Table 6.2.2: Viktorjev spodmol, test trench: specification of retouched bladelets.

Cela Complete	Baza Basal	Pecelj Stemmed	Sredina Medial	Konec Terminal	Hrbet Backed	Hrbet in drobtinčasta retuša Backed and marginal retouch	Drobtinčasta retuša unilateralna Marginal retouch unilateral	Drobtinčasta retuša bilateralna Marginal retouch bilateral
3	8	4	11	4?	19	4	2	3

Najpomembnejši del najdb so mikroliti: klinice, konice in trikotniki.

Med mikroliti so najbolj zastopane **klinice** (t. 2: 24, 27-31). Prevladujejo fragmenti različnih delov klinic, ki so različno retuširane (razpredelnica 6.2.2). Nekateri končni fragmenti so podobni trikotnikom in bi lahko bili njihovi nedokončani primerki. Zanimivi so tudi bazalni odlomki **klinic s pecljem** (t. 3: 32-36), ki so morale biti nasajene. Posebej je treba omeniti hipermikrolitski sredinski fragment klinice (ali konice), ki predstavlja najmanjši najdeni izdelek na najdišču (t. 2: 22). S takimi in še manjšimi orodji so vrtali mikro jagode, ki jih poznamo iz mezolitske plasti v M. Triglavci in z drugih najdišč (glej 2. del tega zbornika).

Med **mikro konicami** sta 2 celi, 6 odlomkov je pripadalo bazi, 2 sredini in 2 vrhu konice (t. 4: 59-68). Ker je bila pri dvokonicah ošiljena tudi baza, je pri odlomkih težko presoditi, kateri konec konice imamo pred seboj. Za mikro konice je značilna strma (hrbet), izjemoma polstrma retuša na obeh robovih, ki se steka proti vrhu konice. V enem primeru se s konico konča samo en, strmo retuširan rob. Dvokoničaste (bikonične) mikro konice so zelo podobne sovterski konici (*pointe de Sauveterre*).

Mikrolitski **trikotniki** *sensu lato* so najbolj značilen element mezolitskega kamenega inventarja (t. 3: 37-50; 4: 52-58; razpredelnica 6.2.3). Združujejo tako prave trikotnike kot klinice s hrbtom in prečno retušo, in se po velikosti in obliki približujejo pravim trikotnikom. Ker je veliko primerkov fragmentiranih, obstaja nevarnost, da sem npr. fragmente, ki so pripadali bazi in sredini trikotnika, napačno opredelil kot fragmente klinic. Med obema osnovnima tipoma trikotnikov (raznostraničnim in enakokrakim) prevladujejo raznostranični, vendar je vprašljivo, ali so vsi trikotniki raznostranični. Nekateri primerki se namreč približujejo enakokrakemu trikotniku (t. 4: 54). Po tem, kako so trikotniki retuširani lahko razlikujem dva podtipa. Prvi ima samo strmo retušo (hrbet) na dveh krajših stranicah. Najdaljša stranica ni retuširana in predstavlja oster rob (t. 3: 39; 4: 52). Drugi podtip se od prvega razlikuje po tem, da ima najdaljšo stranico povsem ali delno zelo fino retuširano, a tako, da se ohranja ostrina roba (t. 3: 40, 41, 48, 49; 4: 54, 57, 58). Vendar so tudi izjeme, pri teh je najdaljša stranica topo retuširana (t. 3. 45, 47). En primerek ima na najdaljši stranici celo naravno top rob s korterksom (t. 3: 44). To nekoliko zmede predstavo o funkciji teh izdelkov, ki jih običajno razlagamo kot armature (vstavljive in zamenljive dele sestavljenih orodij in orožij).

may have wrongly classified e.g., fragments which belonged to the proximal and medial parts of triangles as fragments of bladelets. Between the two basic types of triangle (scalene and isosceles) scalene ones predominate. Some specimens approximate to isosceles triangles (Plate 4: 54). Two sub-types can be distinguished on the basis of how the triangles are retouched. The first sub-type is only backed on the two shorter sides. The longest side (hypotenuse) is not retouched and represents the sharp edge (Plates 3: 39; 4: 52). The other sub-type differs from the first in that the hypotenuse is completely or partially very finely retouched so that it retains its sharp edge (Plates 3: 40, 41, 48, 49; 4: 54, 57, 58). However, there are also exceptions, in which the hypotenuse has a marginal abrupt retouch (Plate 3: 45, 47). One specimen even has a natural abrupt edge with cortex on the hypotenuse (Plate 3: 44). This slightly confuses the presentation of the function of these products, which are normally explained as armatures (parts of composite tools and weapons that can be inserted and exchanged).

Some micro- and macrolithic products are so fragmented that I was unable to define them very precisely.

In addition to products, a great deal of debris of all sizes was also collected (Table 6.2.4).

The most interesting debris consists of **cores** (Plate 1: 3, 6; Table 6.2.5). Small cores of various shape predominate. Among them may be an unusual mini-core (Plate 1: 7). A core on a flake which may have served also as a denticulate scraper is also unusual; insofar as it was merely a core on a flake it was used as a unidirectional core. One fragment of core could have belonged to a unidirectional and pyramidal core.

Among technologically interesting debris I classified mainly **microburins** *sensu lato*, i.e. all notched proximal parts of blades with truncations by the notches. A notch was often made immediately above the butt, so proximal fragments are very short and one after another, except for one (Plate 2: 21), greatly deviate from classical microburins such as, for example, are known from the Pod Črmukljo and M. Triglavca sites.

Among larger debris, **unretouched flakes** greatly predominate, followed by **shatter fragments** (Table 6.2.6). Some shatter fragments with cortex may have been tested pebbles.

Unretouched blades and bladelets are almost all fragmented (Table 6.2.7). Proximal parts greatly predominate among fragments.

Nekaj mikro- in makrolitskih izdelkov je tako fragmentiranih, da jih nisem mogel natančneje opredeliti.

Poleg izdelkov je bilo zbranih tudi veliko odpadkov vseh velikosti (razpredelnica 6.2.4).

Najzanimivejši odpadek so **jedra** (t. 1: 3, 6; razpredelnica 6.2.5). Prevladujejo majhna jedra različnih oblik. Med njimi je lahko tudi eno nenavadno mini jedro (t. 1: 7). Neobičajno je tudi jedro na odbitku, ki bi lahko služilo tudi kot nazobčano strgalo, do stopnje jedra na odbitku pa je bilo izkoriščeno kot enopolarno jedro. Po en fragment jedra bi lahko pripadal enopolarnemu in piramidalnemu jedru.

Med tehnološko zanimive odpadke sem uvrstil predvsem **mikro vbadala** *sensu lato*, tj. vse bazalne dele klin z izjedo in s prečnim prelomom ob njej. Izjeda je bila največkrat narejena tik nad talonom, zato so bazalni odlomki zelo kratki in vsi po vrsti razen enega (t. 2: 21) močno odstopajo od klasičnih mikro vbadal, kakršna npr. poznamo z najdišč Pod Črmukljo in M. Triglavca.

Med večjimi odpadki močno prevladujejo **neretuširani odbitki**, ki jim sledijo **razbitine** (razpredelnica 6.2.6).

Razpredelnica 6.2.3: Viktorjev spodmol, sonda: specifikacija trikotnikov.
Table 6.2.3: Viktorjev spodmol, test trench: specification of triangles.

Trikotniki raznostranični / Triangles scalene				
Cel Complete	Baza Basal	Sredina Medial	Konec Terminal	Hrbet in drobtinčasta retuša Backed and marginal retouch
4-7	0	0	15	7

There were also a great many **flakes and chips** smaller than 5 mm (Table 6.2.5), which Viktor did not find during exploratory excavation.

There are 57 or 4.4% of thermally cracked flakes larger than 5 mm. Traces of thermal treatment are both on the crust of the core and on flakes, as well as on the ventral and dorsal sides of blades, bladelets and flakes.

In addition to stone finds, in the re-examination of sediments from Viktor's test trench the following additional items were discovered: the lamella of a boar's tusk, two medial fragments of bone awls or needles, one distal (terminal) fragment of bone point or needle and two fragments of unidentified bone products (Plate 7: 114/15, 115/9, 116-118).

In the re-examination of the sediments from Viktor's test trench, I arrived at a series of new data and findings.

In addition to insignificant fragments of pottery (38 pieces or 0.32 kg), mainly stone artefacts but also some other occasional finds had been overlooked in the exploratory excavation. Stone finds certainly represent the main item: 98 products and 2386 pieces of debris.

The presumption of the *in situ* manufacture of stone products was confirmed by small debris, which is created mainly in the retouching of products and the preparation of cores. Since we were not overly assiduous in collecting them, their quantity is underestimated, though large enough to allow no doubt as to *in situ* production.

The large number of pieces with cortex allows a reliable conclusion about the average size of pebbles used. It appears that the majority of pebbles were the size of a hazelnut to a walnut. For the most part they were chert.

An important contribution of the re-examination of the sediments are the occasional finds of fragments of rock crystal. This rare raw material was already used

Razpredelnica 6.2.4: Viktorjev spodmol, sonda: odpad.
Table 6.2.4: Viktorjev spodmol, test trench: debris.

Odpadki < 5 mm Debris < 5 mm			Odpadki > 5 mm Debris > 5 mm					Jedra Cores					SKUPAJ TOTAL
Kosov Count	Teža (g) Weight (g)	g/kos g/piece	Kosov Count	Teža (g) Weight (g)	g/kos g/piece	g max	g min	Kosov Count	Teža (g) Weight (g)	g/kos g/piece	g max	g min	Kosov Count
1097	19,5	0,02	**1276**	714	0,56	13,1	< 0,1	**13**	78,1	6,01	27,6	0,3	**2386**

Razpredelnica 6.2.5: Viktorjev spodmol, sonda: specifikacija jeder.
Table 6.2.5: Viktorjev spodmol, test trench: specification of cores.

Neizoblikovana Amorphous	Teža (g) Weight (g)	Enopolarna Unidirectional	Teža (g) Weight (g)	Piramidalna Pyramidal	Teža (g) Weight (g)	Prizmatična Prismatic	Teža (g) Weight (g)
5	6,5; 3,9; 4,2; 4,6; 1,5	1	27,6	0	0	0	0

nadaljevanje / continuation

Posebna* Various*	Teža (g) Weight (g)	Navzkrižna With crossed blank removals	Teža (g) Weight (g)	Kroglasta Spherical	Teža (g) Weight (g)	Diskasta Discoidal	Teža (g) Weight (g)
5	10,9; 6,3; 4,6; 3; 0,6	0	0	0	0	2	4,1; 0,3

*Med posebnimi jedri so: 1 jedro na odbitku, 1 ponovno uporabljeno jedro in 3 fragmenti jeder. / Various cores include: 1 flake core, 1 reutilized core and 3 core fragments.

VIKTORJEV SPODMOL

Nekatere razbitine s korteksom so lahko testirani prodniki.

Neretuširane kline in klinice so skoraj vse fragmentirane (razpredelnica 6.2.7). Med fragmenti močno prevladujejo bazalni deli.

Med odpadom je bilo tudi veliko **lusk in odkruškov,** manjših od 5 mm (razpredelnica 6.2.5), ki jih Viktor pri sondiranju ni našel.

Krakeliranih kosov, večjih od 5 mm, je 57 ali 4,4 %. Sledovi krakeliranja so tako na skorji jeder kot odbitkov kot tudi na ventralni in dorzalni strani klin, klinic in odbitkov.

Poleg kamenih najdb so bili v ponovno pregledanih sedimentih iz Viktorjeve sonde odkriti še naslednji predmeti: lamela merjaščevega čekana, dva medialna fragmenta koščenega šila ali igle, en končni (terminalni) fragment koščene konice ali igle in dva fragmenta nedoločenih koščenih izdelkov (t. 7: 114/15, 115/9, 116–118).

Pri ponovnem pregledu sedimenta Viktorjeve sonde sem se dokopal do vrste novih podatkov in ugotovitev.

Poleg nepomembnih drobcev in fragmentov keramike (38 kosov ali 0,32 kg) so bile pri sondiranju spregledane predvsem kamene, pa tudi nekatere druge redke najdbe. Glavnino vsekakor predstavljajo kamene najdbe: 98 izdelkov in 2.386 odpadkov.

Sum o *in situ* izdelavi kamenih izdelkov je potrdil droben odpadek, ki nastaja predvsem pri retuširanju iz-

in the Palaeolithic, but we also come across it in Mesolithic sites in nearby Italy and elsewhere in Europe.

Because of the more careful collection of finds, the ratios between pieces with cortex and pieces without cortex in Viktor's test trench and the re-examined sediments from Viktor's test trench were completely changed. While previously there were twice as many pieces with cortex, after re-examination there were twice as many without cortex.

The predominance of proximal parts of unretouched blades and bladelets over other parts of blades and bladelets shows that they were intentionally fragmented (segmented) so that they served as blanks for geometric tools, such as trapezes. Geometric tools were probably made mainly from the medial and distal parts of blades and bladelets. So there are few of these parts. Fracturing blades and bladelets without the use of microburin techniques, judging from the debris, was more widespread than fracturing with the aid of these techniques. Since there are almost no trapezes at the site, they used fracturing to make blanks for other geometric tools, such as triangles, or they made trapezes somewhere else.

New finds of thermally treated pieces confirm the suspicion of the heating of pebbles and cores in a fire as part of the technological procedure.

Analysis of the stone finds allows the conclusion that all procedures connected with the working of stone were carried out at the site: from collecting suitable raw materials, of predominantly local origin, testing raw

Razpredelnica 6.2.6: Viktorjev spodmol, sonda: specifikacija odpada > 5 mm.
Table 6.2.6: Viktorjev spodmol, test trench: specification of debris > 5 mm.

Razbitine / Shatter fragments						Odbitki navadni / Non-cortical flakes				
Kosov brez korteksa Count non-cortical	**Kosov s korteksom Count cortical**	**Teža (g) Weight (g)**	**g/kos g/piece**	**g max**	**g min**	**Kosov Count**	**Teža (g) Weight (g)**	**g/kos g/piece**	**g max**	**g min**
100	**57**	344,9	2,20	13,1	0,1	**638**	152,1	0,24	3,7	0,1

nadaljevanje / continuation

Odbitki s korteksom / Cortical flakes					Odbitki laminarni / Laminar flakes				
Kosov Count	**Teža (g) Weight (g)**	**g/kos g/piece**	**g max**	**g min**	**Kosov Count**	**Teža (g) Weight (g)**	**g/kos g/piece**	**g max**	**g min**
276	184,2	0,67	9,5	0,3	**4**	1,6	0,40	0,9	0,1

nadaljevanje / continuation

Neretuširane kline / Unretouched blades					Neretuširane klinice / Unretouched bladelets					SKUPAJ / TOTAL
Kosov Count	**Teža (g) Weight (g)**	**g/kos g/piece**	**g max**	**g min**	**Kosov Count**	**Teža (g) Weight (g)**	**g/kos g/piece**	**g max**	**g min**	**Kosov / Count**
137	29,3	0,21	1,7	0,1	**64**	2,3	0,04	<0,1	<0,1	**1276**

Razpredelnica 6.2.7: Viktorjev spodmol, sonda: specifikacija neretuširanih klin in klinic.
Table 6.2.7: Viktorjev spodmol, test trench: specification of unretouched blades and bladelets.

Neretuširane kline (kosov) / Unretouched blades (count)					Neretuširane klinice (kosov) / Unretouched bladelets (count)				
Cela Complete	**Baza Basal**	**Sredina Medial**	**Konec Terminal**	**SKUPAJ TOTAL**	**Cela Complete**	**Baza Basal**	**Sredina Medial**	**Konec Terminal**	**SKUPAJ TOTAL**
2	97	24	14	**137**	11	42	7	4	**64**

delkov in pri pripravi jeder. Ker se nismo preveč trudili s pobiranjem, je njegova količina podcenjena, vendar dovolj velika, da ne dopušča nobenega dvoma o *in situ* proizvodnji.

Veliko število kosov s korteksom dopušča zanesljiv sklep o povprečni velikosti uporabljenih prodnikov. Kaže, da je bila večina prodnikov v velikosti lešnika do oreha. V glavnem gre za rožence.

Pomemben prispevek ponovnega pregleda sedimentov so redke najdbe odlomkov kristalov kamene strele. Ta redka surovina se je uporabljala že v paleolitiku, nanjo pa naletimo tudi v mezolitskih najdiščih v bližnji Italiji in drugje po Evropi.

Zaradi natančnejšega pobiranja najdb so se popolnoma spremenila razmerja med kosi s korteksom in kosi brez slednjega v Viktorjevi sondi in ponovno pregledanem sedimentu iz Viktorjeve sonde. Medtem ko je bilo prej enkrat več kosov s korteksom, jih je bilo po ponovnem pregledu enkrat več brez korteksa.

Prevladovanje bazalnih delov neretuširanih klin in klinic nad drugimi deli klin in klinic kaže, da so bile namenoma fragmentirane (segmentirane), da so služile kot nastavek za geometrična orodja, kot so npr. trapezi. Geometrična orodja so se verjetno izdelovala predvsem iz srednjega in končnega dela klin in klinic. Zato je teh delov malo. Lomljenje klin in klinic brez uporabe mikrovbadalne tehnike je bilo sodeč po odpakih bolj razširjeno kot lomljenje s pomočjo te tehnike. Ker v najdišču skoraj ni trapezov, so z lomljenjem izdelovali nastavke za druga geometrična orodja, kot so npr. trikotniki, ali pa so trapeze izdelovali kje drugje.

Nove najdbe krakeliranih kosov potrjujejo domnevo o segrevanje prodnikov in jeder v ognju kot delu tehnološkega postopka.

Analiza kamenih najdb dopušča sklep, da so se v najdišču opravljali vsi postopki, povezani z obdelavo kamna: od zbiranja primerne surovine, pretežno lokalnega izvora, testiranja surovine do izdelave končnih izdelkov, in to preko vseh vmesnih faz do popravil in opustitve izrabljenih izdelkov. Tisto, kar se nam je v celoti ohranilo, so nedvomno nerabni odpadki. Nabor značilnih izdelkov, ki so ostali, jasno dokazuje, da najdišče pripada neki mezolitski razvojni stopnji. Kateri, je na podlagi zbranega gradiva in stratigrafske informacije za zdaj težko ugotoviti.

6.3 Arheološke najdbe stratigrafskega izkopavanja profila Viktorjeve sonde (faza IzA)

(razpredelnice 6.3.1-6.3.8; t. 3, 5-7)

Glavni namen stratigrafskega izkopavanja je bil, ugotoviti položaj posamičnih najdb v profilu najdišča do 5 cm natančno.

Zato je bil ob profilu izkopan blok sedimentov veli-

materials, to the manufacture of final products, through all the intermediate phases to the repair and abandonment of used products. Those that have been fully preserved are undoubtedly unused debris. The collection of characteristic products that remained clearly shows that the site belongs to a Mesolithic development level. It is difficult to ascertain which on the basis of the material collected and the stratigraphic information.

6.3 Archaeological Finds of the Stratigraphic Excavation of the Profile of Viktor's Test Ttrench (Phase IzA)

(Tables 6.3.1-6.3.8; Plate 3, 5-7)

The main purpose of the stratigraphic excavation was to establish the position of individual finds in the profile of the site to an accuracy of 5 cm.

So a block of sediments of size 0.2 x 2 x 1 m was excavated along the profile. All finds were collected with the same thickness of horizontal spits which I (I.T.) later coordinated with layers, visually determined in the profile. Since the profile was 2 m long, the finds were collected separately by spits for its left (marked in the field "/1") and right parts (marked in the field "/2"), in order to establish any possible concentration of finds. Since the finds were equally distributed in all spits in both parts of the profile, in the end I treated both parts as a single spatial unit, and the finds stratigraphically by spits. Since the majority of objects were found during washing on sieves, they are without individual coordinates.

A survey of all archaeological finds is given in Table 6.3.1. It is clear from the survey that at least two archaeological levels are represented at the site, as Viktor properly established. Pottery and stone finds and some new age metal objects are characteristic of the upper level, which embraces layer 1 and the upper part of layer 2. The lower level, embracing the lower part of layer 2 and layer 3 is characterised by stone and bone finds and finds of sea molluscs, among which predominate the dove shell *Columbella rustica* (Linné, 1758) typical of Mesolithic sites, as well as finds of the edible thorny oyster *Mytilus galloprovincialis* Lamarck, 1819. Stone artefacts are present in large numbers in all layers and at all depths, but they increase near the boundary between layers 2 and 3 (spits 12-16).

The pottery, with few exceptions, is prehistoric. However, characteristic pieces that could be linked typologically with pottery found in the test trench were not found.

Stone artefacts deserve detailed treatment. Similarly, there are some individual finds that I will mention at the end.

The following characteristic pieces are represented among the products: 2 endscrapers, 7 retouched flakes,

VIKTORJEV SPODMOL

Razpredelnica 6.3.1: Viktorjev spodmol, profil: arheološke najdbe. Navedeno je število kosov.
Table 6.3.1: Viktorjev spodmol, profile: archaeological finds. The number of pieces is stated.

Reženj Spit	Globina Depth (cm)	Plast Layer	Kovinski predmeti Metal objects	Keramika drobci Pottery small fragments	Keramika večji fragm. Pottery large fragments	Kamene najdbe Stone artifacts	Koščene najdbe Bone artifacts	Morski polži Marine gastropods	Morske školjke Bivalve sea shells
1	254	nasutje	0	2	0	173	0	0	0
2	259	disturbed	0	5	0	278	0	0	0
3	264	1 in 2	1	5	0	299	0	0	0
4	269	1 and 2	0	9	2	318	0	0	0
5	274		3	10	3	320	0	0	0
6	279	2	1	11	3	368	0	0	1
7	284		0	8	2*	637	0	0	2
8	289		0	5	3	634	0	0	1
9	294		0	0	0	507	1	0	0
10	299		0	1	0	626	0	0	4
11	304		0	1	0	603	1	1	5
12	309		0	0	0	874	0	2	0
13	314		0	0	0	1167	0	1	6
14	319		0	1?	0	716	0	2	0
15	324	3	0	0	0	981	1	0	3
16	329		0	0	0	746	0	0	1
17	334		0	0	0	445	0	0	0
18	339		0	0	0	277	0	0	0
19	353		0	0	0	189	0	0	2
19	**99**	**3**	**5**	**57**	**13**	**10.158**	**3**	**6**	**25**

* 1 fragment glazirane keramike. / One sherd of glazed ware.

kosti 0,2 x 2 x 1 m. Vse najdbe so bile zbrane po enako debelih vodoravnih režnjih, ki sem jih (I. T.) pozneje uskladil s plastmi, vizualno določenimi v profilu. Ker je bil profil dolg 2 m so bile najdbe zbrane ločeno po režnjih za njegov levi (terenska oznaka "/1") in desni del (terenska oznaka "/2"), da bi ugotovili morebitne koncentracije najdb. Ker so bile najdbe v vseh režnjih enakomerno razporejene v obeh delih profila, sem nazadnje oba dela obravnaval kot prostorsko celoto, najdbe pa stratigrafsko po režnjih. Ker je bila večina predmetov najdena pri spiranju na sitih, so brez individualnih koordinat.

Pregled vseh arheoloških najdb je podan v razpredelnici 6.3.1. Iz nje je razvidno, da sta na najdišču zastopana vsaj dva arheološka nivoja, kot je pravilno ugotovil že Viktor. Za zgornji nivo, ki obsega plast 1 in zgornji del plasti 2 so značilne keramične in kamene najdbe ter nekaj novodobnih kovinskih predmetov. Za spodnji nivo, ki obsega spodnji del plasti 2 in plast 3, so značilne kamene in koščene najdbe ter najdbe morskih polžev, med katerimi prevladuje za mezolitska najdišča značilna golobica *Columbella rustica* (Linné, 1758), kot tudi najdbe užitne klapavice *Mytilus galloprovincialis* Lamarck, 1819. Kamniti artefakti so množično prisotni v vseh plasteh in v vseh globinah, vendar se pomnožijo na prehodu plasti 2 v plast 3 (režnji 12-16).

Keramika je razen redkih izjem prazgodovinska. Čeprav tokrat niso bili najdeni značilni kosi, jo lahko tipološko povežem s keramiko, najdeno v sondi.

Kamniti artefakti zaslužijo podrobno obdelavo. Prav tako nekatere posebne najdbe, ki jih bom omenil na koncu.

5 retouched blades, 3 trapezes, 22 retouched bladelets, 5 micropoints, 15 triangles, 8 fragments of microliths and 30 pieces of technologically interesting debris (Table 6.3.2).

The **endscrapers** are fairly unusual, oval-shaped and made on retouched flakes (Plate 5: 75/10, 76/13).

The **retouched flakes**, in addition to use wear retouch, have also abrupt retouch. One flake has a shallow notch. The retouched flakes also include those with cortex.

The **retouched blades** were all fragmented. Four fragments belonged to the proximal, one to the medial and two to proximal and medial parts. The retouch is either use wear or marginal. Small notches on the edges of the blades are characteristic, so that at least one of the blades is similar to blades of the Montbani type (Plate 6: 83/6). Two blades have concave formed parts where the butt would have been (Plate 6: 85/12; 86/16), in a way that is characteristic for trapezes, though differently from the majority of trapezes found in Mesolithic layers of M. Triglavca. The bulbar end and butt are shaped with the aid of a Clacton notch, but the notch was probably made with pressure and not with a blow.

Only one of the **trapezes** is whole. A fragment of a microtrapeze stands out (Plate 5: 80/16), which was found at the deepest level of all the trapezes and microburins. The presumed bulbar end of two trapezes is concave shaped with a Clacton notch. Distally, there are the remains of a deep notch and fracture plane beside it (Plate 5: 78/10, 79/12). The question is whether the bulbar end was also fractured in a similar way to the distal part of the trapeze.

Razpredelnica 6.3.2: Viktorjev spodmol, profil: specifikacija izdelkov.
Razpredelnica 6.3.2: Viktorjev spodmol, profile: specification of products.

Režen Spit	Globina Depth (cm)	Plast Layer	Praskala Endscrapers		Odbitki Flakes		Kline Blades		Klinice retuširane* Retouched bladelets*	Mikro konice* Micro points*
			Na odbitku On flake	Teža (g) Weight (g)	Retuširani Retouched	Teža (g) Weight (g)	Retuširane Retouched	Teža (g) Weight (g)		
1	254	nasutje								
2	259	dist.								
3	264				1	1,2				
4	269	1 in 2 1 and 2							1	
5	274								2	
6	279				2	0,7; 1,6	2	0,5; 0,3	2	
7	284				1	3,3	1	0,1	2	
8	289						1	1,5		
9	294								2	
10	299	2	1	1,3	2	0,7; 0,9	1	0,7		
11	304								2	1
12	309						1	0,1		1
13	314		1	1,6			1	0,1	2	
14	319				1	0,6			1	1
15	324								3	
16	329								5	2
17	334	3								
18	339									
19	353									
19	**99**	**3**	**2**	**2,9**	**7**	**5,1**	**7**	**3,3**	**22**	**5**

nadaljevanje / continuation

Režen Spit	Globina Depth (cm)	Plast Layer	Trikotniki* Triangles*		Mikroliti* fragmenti Microliths* fragments	Trapezi Trapezes	Mikro vbadala Microburins	Tehnični primerki Technological pieces	SKUPAJ TOTAL Kosov Pieces
			Raznostran. Scalene	Enakokr. Isocele					
1	254	nasutje						3	3
2	259	disturbed	2						2
3	264				1			1	3
4	269	1 in 2 1 and 2						1	2
5	274								2
6	279						1		7
7	284		2		1		1		7
8	289						1		2
9	294						1	1	4
10	299	2	1		2	1	1		9
11	304		1		1				5
12	309					1		3	6
13	314		1	1				1	6
14	319		1					1	6
15	324		2		1			1	7
16	329		2		2	1		1	13
17	334	3	2					1	3
18	339							1	1
19	353								0
19	**99**	**3**	**14**	**1**	**8**	**3**	**5**	**15**	**89**

* Teža posameznega kosa je < 0,1 g, razen redkih izjem. / Weight of single piece is < 0.1 g excluding some exceptions.

Med izdelki so zastopani naslednji značilni kosi: 2 praskali, 7 retuširanih odbitkov, 5 retuširanih klin, 3 trapezi, 22 retuširanih klinic, 5 mikro konic, 15 trikotnikov, 8 fragmentov mikrolitov in 20 tehnološko zanimivih odpadkov (razpredelnica 6.3.2).

Praskali sta precej neobičajni, prišiljeni in izdelani na retuširanem odbitku (t. 5: 75/10, 76/13).

Retuširani odbitki imajo poleg uporabne retuše še strmo retušo. En odbitek ima plitko izjedo. Med retuširanimi odbitki so tudi taki s korteksom.

Microburins are technologically connected with trapezes, of which, like trapezes, there are surprisingly few. All were found in the upper part of layer 2. There are only two typical microburins, of which one has a very shallow notch (Plate 5: 81/6, 82/10). One specimen has a retouched Clacton notch instead of the normal one. One further fragment of a microburin and one fragment of a stemmed piece (Plate 6: 84/8) remain, which I classified among microburins because of the similar technology, although strictly speaking it is not such.

Razpredelnica 6.3.3: Viktorjev spodmol, profil: specifikacija retuširanih klinic.
Table 6.3.3: Viktorjev spodmol, profile: specification of retouched bladelets.

Cela Complete	Baza Basal	Pecelj Stemmed	Sredina Medial	Konec Terminal	Hrbet Backed	Hrbet in drobtinčasta retuša Backed and marginal retouch	Drobtinčasta retuša unilateralna Marginal retouch unilateral	Drobtinčasta retuša bilateralna Marginal retouch bilateral
0	10	0	11	1	11	4	4	3

Retuširane kline so bile vse fragmentirane. Štirje odlomki so pripadali bazi, eden sredini in dva bazi s sredino. Retuša je ali uporabna ali pravilna drobtinčasta. Značilne so majhne izjede na robovih klin, tako da je vsaj ena klina podobna klini tipa Montbani (t. 6: 83/6). Dve klini imata konkavno oblikovan predel, kjer naj bi bil talon (t. 6: 85/12; 86/16), na način, kot je značilen za trapeze, vendar drugače kot pri večini trapezov, najdenih v mezolitski plasti M. Triglavce. Baza in talon sta oblikovana s pomočjo klektonske (*clacton*) izjede, vendar je bila izjeda verjetno narejena s pritiskom in ne z udarcem.

Med **trapezi** je samo en cel. Izstopa fragment mikro trapeza (t. 5: 80/16), ki je bil najden najgloblje od vseh trapezov in mikro vbadal. Domnevna baza dveh trapezov je konkavno oblikovana s klektonsko izjedo. Distalno je ostanek globoke izjede in prelomne ploskve ob njej (t. 5: 78/10, 79/12). Vprašanje je, ali je bila tudi baza lomljena na podoben način kot distalni del trapeza.

S trapezi so tehnološko povezana **mikro vbadala**, ki jih je tako kot trapezov presenetljivo malo. Vsa so bila najdena v zgornjem delu plasti 2. Značilni mikro vbadali sta samo dve pa še od teh ima eno zelo plitko izjedo (t. 5: 81/6, 82/10). En primerek ima namesto običajne retuširane izjede klektonsko. Obstaja še en fragment mikro vbadala in en fragment peclja (t. 6: 84/8), ki sem ga zaradi podobne tehnologije uvrstil med mikro vbadala, čeprav strogo vzeto to ni.

Najštevilnejše in najpomembnejše najdbe so mikroliti.

Med temi so številčno najbolj zastopane **klinice**. Predstavljajo jih izključno fragmenti klinic, ki so bile različno retuširane (razpredelnica 6.3.3). Poleg strme retuše, pravih hrbtov, ki je prevladujoči način retuširanja klinic, se pojavlja tudi manj strma (semiabruptna) in drobtinčasta retuša na enem ali obeh robovih (t. 6: 88/15, 89/14, 90/16). Posebnost je izmenična strma retuša (hrbet) na širokem fragmentu srednjega dela klinice (reženj 5). Možno je, da je ta fragment pripadal konici (t. 6: 91/5). Neobičajen je tudi bazalni fragment klini-

Bladelets are numerically the best represented of microliths. They are exclusively fragments of bladelets which were variously retouched (Table 6.3.3). In addition to abrupt retouch, which is the predominant way of retouching bladelets, semi-abrupt and marginal retouches also appear on one or both edges (Plate 6: 88/15, 89/14, 90/16). A particularity is the alternating abrupt retouch (back) on a wide fragment of the medial part of a bladelet (spit 5). It is possible that this fragment belongs to a point (Plate 6: 91/5). The proximal fragment of a bladelet backed at the bulbar end and one of the edges, and marginally retouched on the other edge (spit 7) is also unusual.

The **micropoints** were all found in the lower part of layer 2 and the upper part of layer 3. All have been preserved more or less fragmentarily and were produced exclusively with the aid of an abrupt retouch (Plate 7: 108/16-113/14). The retouch can be alternating, in which two variants appear: on the same edge or on both edges. Although the points can have two points, because of the abrupt retouch we cannot speak of typical Sauveterrian points but at most of a variant of these.

Microlithic **triangles** *sensu lato* (Table 6.3.4) are the second most numerous product at the site. Their number may be underestimated, since some of the medial fragments of micro bladelets could also be parts of triangles. All triangles are scalene except for one, which is isosceles (Plate 7: 105/13). The majority of specimens belong to the type with retouched hypotenuse. The retouch on the hypotenuse can be partial (limited to the distal or proximal part) or complete, direct or inverse, marginal or abrupt. The last named is on the proximal part on two specimens and creates a kind of stemmed piece (Plate 6: 94/16; 7: 107/10). The latter and the marginal retouch (including denticulates) at the end of the hypotenuse would indicate that the lower part of the triangles was helved. Fragments of triangles found which, because of the damage, may have been rejected during the exchange of parts of armatures, also points in this direction. One triangle has the hypotenuse entirely ab-

Razpredelnica 6.3.4: Viktorjev spodmol, profil: specifikacija trikotnikov.
Table 6.3.4: Viktorjev spodmol, profile: specification of triangles.

Trikotniki raznostranični Triangles scalene						
Cel Complete	Baza Basal	Sredina Medial	Konec Terminal	Hrbet in drobtinčasta retuša Backed and marginal retouch	Hrbet in strma retuša Backed and abrupt retouch	Pecelj in drobtinčasta retuša Stemmed and marginal retouch
4	1	1	8	7	1	2

ce s strmo retušo na bazi in enem od robov in drobtinčasto retušo na drugem robu (reženj 7).

Mikro konice so bile vse najdene v spodnjem delu plasti 2 in zgornjem delu plasti 3. Vse so ohranjene bolj ali manj fragmentarno in izdelane izključno s pomočjo strme retuše (t. 7: 108/16-113/14). Retuša je lahko izmenična, pri čemer nastopata obe izvedbi: na istem robu ali na dveh robovih. Čeprav so konice lahko imele dvojno konico, zaradi strmega retuširanja ne moremo govoriti o značilni sovterski konici, temveč kvečjemu o njeni različici.

Mikrolitski **trikotniki** *sensu lato* (razpredelnica 6.3.4) so drugi najštevilnejši izdelki na najdišču (t. 6: 92/13-101/7; 7: 102/15-107/10). Njihovo število je lahko podcenjeno, saj so lahko nekateri središčni odlomki mikro klinic s hrbtom tudi deli trikotnikov. Vsi trikotniki so raznostranični razen enega, ki je enakokrak (t. 7: 105/13). Večina primerkov pripada tipu z retuširano najdaljšo stranico. Retuša na najdaljši stranici je lahko delna (omejena na konec ali bazo) ali popolna, direktna ali inverzna, lahko je drobtinčasta ali strma. Zadnja je v dveh primerih na bazi in tvori nekakšen pecelj (t. 6: 94/16; 7: 107/10). Slednje in pa drobtinčasta retuša (z zobci vred) na koncu najdaljše stranice bi kazalo na to, da je bil spodnji del trikotnikov nasajen. V to smer kažejo tudi najdeni fragmenti trikotnikov, ki bi bili lahko zaradi poškodb zavrženi pri zamenjavi delov armatur. En trikotnik ima najdaljšo stranico v celoti topo retuširano (t. 6: 92/13). To ponovno postavlja pod vprašaj namembnost teh izdelkov oziroma enoznačno razlago njihove uporabe. Ni izključeno, da so se tudi trikotniki, podobno kot veliko kamenih orodij, uporabljali za različne namene.

Največ trikotnikov je bilo najdenih v spodnjem delu plasti 2 in v zgornjem delu plasti 3. Ker so trikotniki skupaj z morskimi polži, ki so bili vsi najdeni v spodnjem delu plasti 2 (glej razpredelnico 6.3.1), značilni za mezolitik, lahko lociram mezolitski horizont v bližino meje med plastjo 2 in 3.

V Viktorjevi sondi so bili najdeni tudi štirje majhni **peclji** (t. 3: 32-35), ki sem jih začasno opredelil kot fragmente mikro klinic, čeprav bi lahko pripadali tudi trikotnikom.

Med **fragmenti mikrolitov** so primerki, ki bi lahko, glede na kombinacijo hrbet-hrbet in hrbet-drobtinčasta retuša pripadali bodisi konicam bodisi trikotnikom. Zanimiv je fragment izdelka s hrbtom, ki je bil poškodovan pri udarcu na njegov konec (t. 7: 110/11). Domnevam, da je fragment pripadal izstrelku, npr. puščici s kameno konico.

Tehnološko zanimivim primerkom pripadajo mikro vbadala in drugi **tehnološki kosi**.

Med temi so deli tipološko nedoločenih jeder, ki lahko pomagajo razumeti tehnološke procese, povezane z njihovim pridobivanjem in izrabo. Dalje so tu vbadalni odbitki, čeprav je presenetljivo, da med vsem zbranim gradivom ni niti enega vbadala. Pa en odbitek

ruptly or semi-abruptly retouched (Plate 6: 92/13). This again raises a question of the purpose of these products, or a uniform explanation of their use. It cannot be excluded that triangles, too, as with many stone tools, were used for various purposes.

The most triangles were found in the lower part of layer 2 and the upper part of layer 3. Since triangles, together with sea molluscs, which were all found in the lower part of layer 2 (see Table 6.3.1), are typical of the Mesolithic, the Mesolithic horizon can be located in the vicinity of the boundary between layers 2 and 3.

Four small **stemmed pieces** were also found in Viktor's test trench (Plate 3: 32-35), which for the moment I have classified as fragments of micro bladelets, although they could also belong to triangles.

Among **fragments of microliths** are specimens which, in view of the combination abrupt-abrupt retouch and abrupt-marginal retouch, could belong to either points or triangles. The fragment of a backed piece is interesting, which was damaged by a blow at its tip (Plate 7: 110/11). I suspect that the fragment belongs to a projectile, e.g., an arrow with a stone point.

Technologically interesting specimens include microburins and other **technological pieces**. Among them are parts of unidentified cores, which could help in understanding the technological processes connected with obtaining and using them. Furthermore, there are burin spalls here, although it is surprising that among all the collected material there is not a single burin. Although there are one flake of *Kombewa* type (spit 13) and thin flakes with negative bulb of percussion (*contre-bulbe*), found in spits 12-18 (Plate 5: 74/15). Paper thin flakes with negative bulb and butt in the shape of a flattened curve of normal distribution could only have been made with pressure on the point, and probably one immediately after another. Good cores were thus exploited to the maximum. The understanding of thrift by the makers of the stone products is also demonstrated by the cores on flakes (Plate 5: 71/12) and the *Kombewa* flake.

As in Viktor's test trench, there were quite a number of thermally treated pieces in the stratigraphically excavated sector. Among the debris larger than 3 mm, at least 23, or 2%, were thermally cracked. Among the products, 5 or 5.6% were thermally cracked. It is interesting in this that both in the test trench and in the stratigraphically excavated sector there were no major remains of hearths. On the other hand, there were a lot of burned and also calcified bone fragments and some scattered fragments of charcoal. I associate thermally cracked pieces with deliberately thermally prepared raw materials and blanks for further processing.

The majority of stone finds represent debris, which is normal with the working of stone (Table 6.3.5).

Cores are among the technologically more interesting debris (Plate 5: 69/10-73/15; Table 6.3.6). As in the test trench, small ones predominate in the profile.

Razpredelnica 6.3.5: Viktorjev spodmol, profil: odpad.
Table 6.3.5: Viktorjev spodmol, profile: debris.

Izkop Spit	Globina Depth (cm)	Plast Layer	Odpadki < 3 mm Debris < 3 mm			Odpadki > 3 mm Debris > 3 mm				
			Kosov Count	Teža (g) Weight (g)	g/kos g/piece	Kosov Count	Teža (g) Weight (g)	g/kos g/piece	g max	g min
1	254	nasutje	162	0,7	0,0043	10	5,1	0,51	0,8	< 0,1
2	259	disturb.	261	1,9	0,0073	16	4,7	0,29	1,5	< 0,1
3	264	1 in 2	261	1,8	0,0069	35	16,4	0,47	5,1	< 0,1
4	269	1 and 2	284	2,2	0,0077	31	15,3	0,49	2,0	< 0,1
5	274		290	1,6	0,0055	26	12,5	0,48	2,0	< 0,1
6	279		335	2,4	0,0072	33	34,1	1,03	7,5	< 0,1
7	284		576	3,7	0,0064	59	16	0,27	2,0	< 0,1
8	289		551	3,2	0,0058	79	50,8	0,64	7,7	< 0,1
9	294		434	2,4	0,0055	73	42,3	0,58	10,3	< 0,1
10	299	2	505	3,1	0,0061	117	58,5	0,50	6,5	< 0,1
11	304		518	3,1	0,0060	80	31,4	0,39	7,8	< 0,1
12	309		752	4,5	0,0060	120	53,6	0,45	5,9	< 0,1
13	314		1021	5,9	0,0058	141	81,5	0,58	8,5	< 0,1
14	319		604	3,5	0,0058	109	51,3	0,47	6,5	< 0,1
15	324		876	5,6	0,0064	98	29,4	0,30	3,1	< 0,1
16	329		666	4,2	0,0063	79	24,4	0,31	4,0	< 0,1
17	334	3	421	2,4	0,0057	24	2,7	0,11	0,7	< 0,1
18	339		259	1,5	0,0058	18	2,5	0,14	1,5	< 0,1
19	353		182	1	0,0055	7	0,8	0,11	0,2	< 0,1
19	**99**	**3**	**8958**	**54,7**	**0,0061**	**1155**	**533,3**	**0,46**	**10,3**	**< 0,1**

nadaljevanje / continuation

Izkop Spit	Globina Depth (cm)	Plast Layer	Razbitine prodnikov* Shattered pebbles					Jedra Cores					SKUPAJ TOTAL
			Kosov Count	Teža (g) Weight (g)	g/kos g/piece	g max	g min	Kosov Count	Teža (g) Weight (g)	g/kos g/piece	g max	g min	Kosov Count
1	254	nasutje	1	3	3,00	3,0	3,0	0	0	0	0	0	173
2	259	dist.	1	1	1,00	1,0	1,0	0	0	0	0	0	278
3	264	1 in 2	3	108,4	36,13	73,6	5,5	0	0	0	0	0	299
4	269	1 and2	3	15,1	5,03	6,2	4,1	0	0	0	0	0	318
5	274		2	6,8	3,40	4,1	2,7	2	8,6	4,30	4,4	4,2	320
6	279		0	0	0	0	0	0	0	0	0	0	368
7	284		1	11,9	11,90	11,9	11,9	1	38,2	38,20	38,2	38,2	637
8	289		3	73,4	24,47	66,0	2,2"	1	9,9	9,90	9,9	9,9	634
9	294		0	0	0	0	0	0	0	0	0	0	507
10	299	2	2	29,5	14,75	18,3	11,2	2	32,9	16,45	26,6	6,3	626
11	304		4"	50,2	12,55	29,9	2,0	1	7	7,00	7,0	7,0	603
12	309		1"	7,6	7,60	7,6	7,6	1	4,5	4,50	4,5	4,5	874
13	314		5"	38,1	7,62	15,0	0,8	0	0	0	0	0	1167
14	319		2	27,8	13,90	25,9	1,9	1	12,7	12,70	12,7	12,7	716
15	324		3"	21,8	7,27	13,9	3,0	4	35,2	8,80	21,8	3,5	981
16	329		0	0	0	0	0	1	0,4	0,40	0,4	0,4	746
17	334	3	0	0	0	0	0	0	0	0	0	0	445
18	339		0	0	0	0	0	0	0	0	0	0	277
19	353		0	0	0	0	0	0	0	0	0	0	189
19	**99**	**3**	**31**	**394,6**	**12,73**	**73,6**	**0,8**	**14**	**149,4**	**10,67**	**38,2**	**0,4**	**10158**

* Med razbitinami prodnikov so tudi štirje komaj načeti prodniki. Označeni so z ("). / Amongst shattered pebbles are four almost complete. They are signed with (").

tipa *Kombewa* (reženj 13) in tenki odbitki z negativom bulbusa (*contre-bulbe*), najdeni v režnjih 12–18 (t. 5: 74/15). Papirnato tenki odbitki z negativom bulbusa in talonom v obliki sploščene krivulje normalne porazdelitve so bili lahko narejeni samo s pritiskom na točko, in to verjetno tik eden za drugim. Tako so bila dobra jedra maksimalno izkoriščena. Na gospodarno vedenje izdelovalcev kamenih izdelkov kažejo tudi jedra na odbitkih (t. 5: 71/12) in odbitek *Kombewa*.

One pyramidal core is a real miniature (Plate 5: 77/16). One prismatic core (Plate 5. 70/10; 72/15), a core with crossed blank removals (Plate 1. 9/5) and a spherical core (Plate 5: 69/10) are novelties. A further core on a flake was additionally found (Plate 5: 71/12). Unidirectional cores (Plate 5: 15) and pyramidal cores are already known from Viktor's test trench. Among special cores is one on a flake, one completely exploited core and a fragment of a unidirectional (?) core. Finally, for

Razpredelnica 6.3.6: Viktorjev spodmol, profil: specifikacija jeder.
Table 6.3.6: Viktorjev spodmol, profile: specification of cores.

Izkop Spit	Globina Depth (cm)	Plast Layer	Neizoblikovana Amorphous Teža (g) Weight (g)	Enopolarna Unidirectional Teža (g) Weight (g)	Piramidalna Pyramidal Teža (g) Weight (g)	Prizmatična Prismatic Teža (g) Weight (g)	Navzkrižna Crossed* Teža (g) Weight (g)	Kroglasta Spherical Teža (g) Weight (g)	Posebna** Various** Teža (g) Weight 8g)
1	254	nasutje dist.							
2	259								
3	264	1 in 2 1 and 2							
4	269								
5	274			1 4,2			1 4,4		
6	279								
7	284			1 38,2					
8	289				1 9,9				
9	294								
10	299	2				1 6,3		1 26,6	
11	304							1? 7	
12	309								2 4,6; 5,1
13	314								
14	319		1 12,7						
15	324		1 21,8	1 4,1	1 5,8				1 3,5
16	329				1 0,4				
17	334	3							
18	339								
19	353								
19	**99**	**3**	**2 34,5**	**3 46,5**	**3 16,1**	**1 6,3**	**1 4,4**	**1 33,6**	**3 9,7**

* Cores with crossed blank removals.
** Med posebnimi jedri so: 1 jedro na odbitku, 1 povsem izrabljeno jedro in 1 fragment jedra. / Various cores include: 1 flake core, 1 totally exploited core and 1 core fragment.

Podobno kot v Viktorjevi sondi je bilo tudi v stratigrafsko izkopanem sektorju kar nekaj krakeliranih kosov. Med odpadki, večjimi od 3 mm, je bilo vsaj 23 krakeliranih ali 2 %. Med izdelki je bilo 5 krakeliranih ali 5,6 %. Pri tem je zanimivo, da tako v sondi kot v stratigrafsko izkopanem sektorju ni bilo večjih ostankov ognjišč. Po drugi strani pa je bilo veliko zažganih in tudi kalciniranih kostnih odlomkov ter nekaj razpršenih drobcev oglja. Krakelirane kose povezujem z namensko termično pripravo surovine in nastavkov za nadaljno obdelavo.

Večino kamenih najdb predstavlja **odpadek**, kar je običajno za obdelavo kamna (razpredelnica 6.3.5).

Med tehnološko zanimivejšimi odpadki so **jedra** (t. 5: 69/10–73/15; razpredelnica 6.3.6). Podobno kot v sondi tudi v profilu prevladujejo majhna. Eno piramidalno jedro je prav miniaturno (t. 5: 77/16). Novost je po eno prizmatično (t. 5. 70/10; 72/15), navzkrižno (t. 1. 9/5) in kroglasto jedro (t. 5: 69/10). Najdeno je bilo še eno jedro na odbitku (t. 5: 71/12). Enopolarno (t. 5: 15) in piramidalno jedro poznamo že iz Viktorjeve sonde. Med posebnimi jedri je eno na odbitku, eno povsem izrabljeno jedro in en fragment enopolarnega(?) jedra. Z jeder so bili nazadnje odbiti večinoma odbitki in le v dveh primerih kline.

Med odpadki, večjimi od 3 mm, močno prevladujejo odbitki, ki jim sledijo razbitine (razpredelnica 6.3.7).

Razbitine sem razdelil na tiste s korteksom in tiste

the most part flakes were knapped from cores and only in two cases blades.

Among debris larger than 3 mm, flakes greatly predominate, followed by shatter fragments (Table 6.3.7).

I divided **shatter fragments** into those with cortex and those without. As with Viktor's test trench, there were almost twice as many shatter fragments without cortex as those with cortex.

The size of pebbles used could be visually assessed on the basis of their shatter fragments, which I give individually here (Table 6.3.5), and of shatter fragments with cortex and flakes with cortex. Most pebbles, as in Viktor's test trench, were of the size of walnuts to hazelnuts.

I divided **flakes** into ordinary, i.e., without cortex, and flakes with cortex. I found that the ratio between ordinary flakes (without cortex) and flakes with cortex changed in comparison with Viktor's test trench. The number of ordinary flakes this time almost doubled, which is an unexpected result that could be ascribed to the great spatial variability of the finds.

Unretouched blades and bladelets are for the most part fragmented (Table 6.3.8). Proximal parts, which are exceptionally concave, greatly predominate among the fragments. This is in complete agreement with the picture in Viktor's test trench. It is therefore difficult to doubt the deliberate fracturing of blades and bladelets and ascribe the fragments to the operation of natural forces.

 VIKTORJEV SPODMOL

Razpredelnica 6.3.7: Viktorjev spodmol, profil: specifikacija odpada > 3 mm.
Table 6.3.7: Viktorjev spodmol, profile: specification of debris > 3 mm.

Izkop Spit	Globina Depth (cm)	Plast Layer	Razbitine Shatter fragments: Kosov brez korteksa Count non-cortical	Razbitine: Kosov s korteksom Count cortical	Razbitine: Teža (g) Weight (g)	Razbitine: g/kos g/piece	Razbitine: g max	Razbitine: g min	Odbitki navadni Non-cortical flakes: Kosov Count	Odbitki navadni: Teža (g) Weight (g)	Odbitki navadni: g/kos g/piece	Odbitki navadni: g max	Odbitki navadni: g min
1	254	nasutje	3	1	1,8	0,45	0,8	0,3	0	0	0	0	0
2	259	nasutje	6	3	2,2	0,24	1,3	0,2	5	2,5	0,50	1,5	< 0,1
3	264	1 in 2	12	2	4	0,29	1,8	< 0,2	12	6,4	0,53	5,1	< 0,1
4	269	1 in 2	10	7	15,8	0,93	2,0	0,1	8	2,5	0,31	1,4	< 0,1
5	274	1 in 2	3	2	4,2	0,84	2,0	0,2	17	4,2	0,25	0,9	< 0,1
6	279	2	9	3	9,1	0,76	7,1	< 0,1	11	4,6	0,42	1,9	< 0,1
7	284	2	13	6	6	0,32	2,0	< 0,1	31	8,0	0,26	1,5	< 0,1
8	289	2	14	7	30,6	1,46	7,7	< 0,1	48	7,4	0,15	0,8	< 0,1
9	294	2	9	4	17,8	1,37	10,3	< 0,1	32	4,2	0,13	2,4	< 0,1
10	299	2	24	10	28,8	0,85	4,2	< 0,1	64	9,8	0,15	3,2	< 0,1
11	304	2	16	6	15	0,68	7,8	< 0,1	47	7,0	0,15	1,0	< 0,1
12	309	2	16	2	7,8	0,43	5,9	< 0,1	74	18	0,24	2,9	< 0,1
13	314	2	18	1	11,2	0,59	3,3	< 0,1	94	32,9	0,35	4,0	< 0,1
14	319	2	12	0	10,5	0,88	5,5	< 0,1	71	12,3	0,17	1,8	< 0,1
15	324	3	12	0	4,9	0,41	1,6	< 0,1	66	15,1	0,23	3,1	< 0,1
16	329	3	17	1	4,6	0,26	2,0	< 0,1	39	13,8	0,35	4,0	< 0,1
17	334	3	4	0	0,2	0,05	0,7	< 0,1	12	1,0	0,08	0,6	< 0,1
18	339	3	5	0	0,3	0,06	0,1	< 0,1	11	2,1	0,19	1,5	< 0,1
19	353	3	3	0	0,4	0,13	0,2	0,1	4	0,4	0,10	0,1	< 0,1
19	99	3	**206**	**55**	175,2	0,67	10,3	< 0,1	**646**	152,2	0,24	5,1	< 0,1

nadaljevanje / continuation

Odbitki s korteksom Cortical flakes: Kosov Count	Teža (g) Weight (g)	g/kos g/piece	g max	g min	Odbitki laminarni Laminar flakes: Kosov Count	Teža (g) Weight (g)	g/kos g/piece	g max	g min	Kline neretuširane Unretouched blades: Kosov Count	Teža (g) Weight (g)	g/kos g/piece	g max	g min	Klinice neretuširane Unretouched bladelets: Kosov Count	Teža (g) Weight (g)	SKUPAJ TOTAL: Kosov Count
0	0	0	0	0	4	1,2	0,30	0,7	< 0,1	0	0	0	0	0	0	0	8
0	0	0	0	0	2	0	0,00	< 0,1	< 0,1	0	0	0	0	0	0	0	16
6	5,5	0,92	2,1	0,3	2	0,1	0,05	< 0,1	< 0,1	1	0,4	0,40	0,4	0,4	0	0	35
4	1	0,25	1,9	< 0,1	1	0,4	0,40	0,4	0,4	1	0,4	0,40	0,4	0,4	1	0	32
4	4,1	1,03	1,5	0,2	0	0	0	0	0	0	0	0	0	0	0	0	26
10	20,4	2,04	7,5	< 0,1	0	0	0	0	0	0	0	0	0	0	0	0	33
4	1,2	0,30	0,7	0,2	0	0	0	0	0	2	0,8	0,40	0,6	0,2	3	0,1	59
9	17,9	1,99	6,6	< 0,1	0	0	0	0	0	2	0,2	0,10	0,1	0,1	0	0	80
10	6,1	0,61	3,2	< 0,1	5	1,2	0,24	0,6	0,1	11	7,4	0,67	2,6	0,1	2	0	73
17	18,8	1,11	6,5	< 0,1	0	0	0	0	0	1	1,1	1,10	1,1	1,1	1	0	117
5	7,1	1,42	3,6	0,1	1	0,4	0,40	0,4	0,4	5	1,8	0,36	0,8	0,1	0	0	80
19	22,2	1,17	2,9	< 0,1	5	4,7	0,94	1,6	0,8	2	0,8	0,40	0,7	0,2	2	0,1	120
24	37,1	1,55	8,5	< 0,1	0	0	0	0	0	1	0,2	0,20	0,2	0,2	3	0,1	141
23	27,3	1,19	6,5	< 0,1	0	0	0	0	0	2	1,2	0,60	0,9	0,9	1	0	109
12	7,4	0,62	2,4	< 0,1	0	0	0	0	0	5	1,9	0,38	0,6	0,2	3	0,1	98
12	5	0,42	0,3	< 0,1	0	0	0	0	0	4	0,9	0,23	0,4	0,1	6	0,2	79
2	0,8	0,40	0,1	< 0,1	0	0	0	0	0	3	0,6	0,20	0,3	0,1	3	0,1	24
2	0,1	0,05	0,1	< 0,1	0	0	0	0	0	0	0	0	0	0	0	0	18
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
163	182	1,12	8,5	< 0,1	**20**	8	0,40	1,6	< 0,1	**40**	17,7	0,44	2,6	0,1	**25**	0,7	**1155**

brez njega. Razbitin brez korteksa je tako kot v Viktorjevi sondi približno enkrat več.

Velikost uporabljenih prodnikov lahko vizualno ocenim na podlagi njihovih razbitin, ki sem jih tokrat navedel posebej (razpredelnica 6.3.5), ter razbitin s korteksom in odbitkov s korteksom. Največ prodnikov je bilo tako kot v Viktorjevi sondi v velikosti oreha do lešnika.

Odbitke sem razdelil na navadne, tj. brez korteksa, in na odbitke s korteksom. Ugotovil sem, da se je spremenilo razmerje med navadnimi odbitki (brez korteksa) in odbitki s korteksom v primerjavi z Viktorjevo son-

One medial fragment of unretouched blade has the shape of a trapeze (Plate 6: 87/4).

Chips smaller than 3 mm make up the great majority of debris (Table 6.3.5). Their distribution in the spits is interesting. In the first and last two spits, their number quickly falls, which suggests that the deposit of these finds, which are connected with the activity of working stone, was somewhere in between. In fact, the majority of finds are on the boundary of layers 2 and 3, where I envisaged the Mesolithic horizon to be, on the basis of microliths and sea molluscs.

Razpredelnica 6.3.8: Viktorjev spodmol, profil, specifikacija neretuširanih klin in klinic.
Table 6.3.8: Viktorjev spodmol, profile, specification of unretouched blades and bladelets.

Neretuširane kline (kosov) Unretouched blades (count)						Neretuširane klinice (kosov) Unretouched bladelets (count)					
Cela Complete	Skoraj cela* Almost complete*	Baza Basal	Sredina Medial	Konec Terminal	SKUPAJ TOTAL	Cela Complete	Skoraj cela* Almost complete*	Baza Basal	Sredina Medial	Konec Terminal	SKUPAJ TOTAL
1	2	27	7	3	**40**	6	2	11	4	2	**25**

* V tej skupini so primerki, ki imajo odlomljen samo konec. / This category includes only terminally broken blades and bladlets.

do. Število navadnih odbitkov se je tokrat skoraj podvojilo, kar je nepričakovan rezultat, ki ga lahko pripišem veliki prostorski variabilnosti najdb.

Neretuširane kline in klinice so večinoma fragmentirane (razpredelnica 6.3.8). Med fragmenti močno prevladujejo bazalni deli, ki so izjemoma konkavno oblikovani. To se popolnoma ujema s sliko v Viktorjevi sondi. Zato bi težko podvomil o namenskem lomljenju klin in klinic ter fragmente pripisal delovanju naravnih sil.

En medialni fragment neretuširane kline ima obliko trapeza (t. 6: 87/4).

Veliko večino odpada predstavljajo **luske in odkruški,** manjši od 3 mm (razpredelnica 6.3.5). Zanimiva je njihova porazdelitev v režnjih. V prvih in zadnjih dveh režnjih se njihovo število hitro zmanjša, kar kaže na to, da je bilo težišče teh najdb, ki so povezane z dejavnostjo obdelave kremena, nekje vmes. Dejansko je največ najdb na meji plasti 2 in 3, kjer sem na podlagi mikrolitov in morskih polžev predvidel mezolitski horizont.

Kamenim najdbam se je v stratigrafsko izkopanem sektorju pridružilo še nekaj drugih, redkih najdb, ki jih ni bilo v Viktorjevi sondi. Predvsem sta to dve preluknjani in dve fragmentirani hišici morskega polža *Columbella rustica* in po ena hišica morskega polža *Nassarius cuvieri* ter *Fossarus* sp. (razpredelnica 6.3.1). Potem je to odbitek (reženj 3), ki ima na ventralni strani več nepravilnih vrezov. Enkratna najdba je obroček (reženj 2), ki v premeru meri samo nekaj več kot 1 mm. Reženj 5 je vseboval odlomek brusa iz peščenjaka, reženj 9 fragment koščene igle, reženj 11 in 15 pa po en odlomek uporabljenega parožka (t. 7: 114/15).

Glavni izsledki stratigrafskega izkopavanja so poleg osnovnega cilja - stratigrafije - naslednji:

Kljub relativno majhnemu volumnu odkopanih sedimentov (približno 0,35 m^3) je bilo najdenih 89 izdelkov in 10.158 odpadkov. V primerjavi s sondo je vseh najdb več kot trikrat toliko, ker je bil ves sediment večkrat in natančneje pregledan.

Kamene najdbe ponujajo dober vpogled v najdišče kot celoto. Tipološka opredelitev najdb v mezolitik ni sporna. Znani so tudi tehnološki vidiki obdelave kamna od surovinske baze, preko priprave in izkoristka jeder do nastavkov in končnih izdelkov. Izbor izdelkov in tehnik se bi z večjimi izkopavanji sicer nekoliko povečal (odvisno od natančnosti dela), povečala bi se tudi zanesljivost stratigrafskih in drugih skupkov, vendar se ne bi bistveno spremenila splošna slika vseh najdb.

Stone finds are associated in the stratigraphically excavated sector with some other occasional finds which were not in Viktor's test trench. Above all these are two perforated and two fragmented shells of the dove shell *Columbella rustica* and one shell each of the seashells *Nassarius cuvieri* and *Fossarus* sp. (Table 6.3.1). Then there is a flake (spit 3) with a number of irregular cuts on the ventral side. A unique find is a small band (spit 2) measuring only slightly more than 1 mm in diameter. Spit 5 contained a fragment of whetstone from sandstone, spit 9 a fragment of a bone needle, spits 11 and 15 each a fragment of used tine (prong of an antler) (Plate 7: 114/15).

The main results of the stratigraphic excavation, in addition to the basic aim - stratigraphy - are the following:

Despite the relatively small volume of the excavated sediments (approx. 0.35 m^3), 89 products and 10,158 pieces of debris were found. In comparison with the test trench, there are more than three times as many of all finds, because the whole sediment was very carefully examined several times.

The stone finds provide a good insight into the site as a whole. The typological classification of the finds into the Mesolithic is not in doubt. The technological aspects of working stone from the raw material base, through preparation and exploitation of cores to blanks and final products, are also known. The selection of products and techniques would be somewhat increased with a larger excavation (depending on the precision of the work), and the reliability of the stratigraphy and other groupings would also be increased, but the general picture of all the finds would not essentially change.

6.4 Comparison of the Results of Individual Phases of the Excavations (Tables 6.4.1-6.4.3)

Comparison of the individual phases of the excavations, connected with various fieldwork methods, is very instructive since it has a great analogy to archaeological practice in general.

Viktor's classical excavations (Viktor phase) gave relatively few stone finds, which were all larger than 3 mm.

The weight of finds ranged between 139 g and 0.1 g, and on average they were 7.95 g.

6.4 PRIMERJAVA REZULTATOV POSAMEZNIH FAZ IZKOPAVANJ (razpredelnice 6.4.1-6.4.3)

Primerjava posameznih faz izkopavanj, povezanih z različnimi terenskimi metodami, je zelo poučna, saj ima veliko analogij v splošni arheološki praksi.

Viktorjeva klasična izkopavanja (faza Viktor) so dala relativno malo kamenih najdb, ki so bile vse večje od 3 mm.

Teža najdb se je gibala med 139 g in 0,1 g, povprečno pa so bile težke 7,95 g.

Med njimi razen praskal in odbitkov s prečno retušo ni bilo posebnih tipov.

Številna jedra so bila tipološko zelo raznolika. Njihova teža se je gibala med 19,3 g in 3,1 g, povprečno pa so bila težka 6,71 g.

Med odpadki (kosi brez vidnih sledov uporabe) so prevladovali neretuširani odbitki, tem so sledile razbitine, na zadnjem mestu pa so bile neretuširane kline.

O kakšni mikrolitizaciji proizvodov ni bilo ne duha ne sluha.

Pregled dela izkopanih sedimentov na Inštitutu za arheologijo (faza Viktor in IzA) je radikalno spremenil sliko najdb, dobljeno na podlagi Viktorjevega sondiranja.

Število kamenih najdb se je povečalo od 173 na 2.484 (razpredelnica 6.4.1), temeljito sta se spremenila tudi kakovost in sestav zbirke (razpredelnica 6.4.2).

Teža novih najdb se je gibala med 13,1 g in manj kot 0,1 g, povprečno pa so bile težke samo 0,34 g, kar pomeni, da se je zelo povečalo število mikrolitov in drugih majhnih najdb. Med njimi so se, poleg že znanih izdelkov, pojavili številni novi tipi, vključno z mikroliti (izdelki, lažji od 0,1 g).

Pri jedrih ni bilo novosti. Njihova teža se je gibala med 27,6 g in 0,3 g, povprečno pa so bila težka 6,01 g.

Med odpadki, večjim od 5 mm, so prevladovali neretuširani odbitki. Približno enako so bile zastopane razbitine in neretuširane kline.

Mikrolitizacijo proizvodnje so kazale številne neretuširane klinice in mikroliti, ki jih je Viktor spregledal. Pomemben delež so imele mikro luske in odkruški, ki so nastali pri retuširanju. Tudi te je Viktor spregledal.

Stratigrafsko mini izkopavanje članov Inštituta za arheologijo (faza IzA) je še bolj povečalo število najdb, zlasti najmanjših, pridobljenih na podlagi Viktorjevega sondiranja in pregledovanja sedimentov iz sonde (razpredelnica 6.4.1).

Kljub petkrat manjšemu volumnu izkopanih sedimentov v primerjavi z volumnom Viktorjeve sonde je število najdb naraslo od 2.484 na10.227, predvsem zaradi zelo natančnega, trikratnega pregleda sedimentov. Takšen način dela je omogočil oceno napake v metodi, ki sicer velja za zelo zanesljivo, čeprav to vedno ne drži.

Kakovostna podoba zbirke se je zopet bistveno spremenila (razpredelnica 6.4.2), vendar to ni spremenilo

There were no special types among them, except endscrapers and truncated flakes.

The numerous cores were typologically very varied. Their weight ranged between 19.3 g and 3.1 g, with an average of 6.71 g.

Among the debris (pieces without visible traces of use) unretouched flakes predominated, followed by shatter fragments, and in last place, unretouched blades.

There was no trace at all of any microlithisation of products.

The review of part of the excavated sediments at the Institute of Archaeology (Viktor and IzA phase) radically changed the picture of the finds obtained on the basis of Viktor's exploratory excavation.

The number of stone finds increased from 173 to 2484 (Table 6.4.1), and the quality and composition of the collection also fundamentally changed (Table 6.4.2).

The weight of the new finds ranged between 13.1 g and less than 0.1 g, and the average was only 0.34 g, which means that the number of microliths and other small finds greatly increased. Among them, in addition to already known products, appeared a number of new types, including microliths (products lighter than 0.1 g).

There were no novelties among cores. Their weight ranged between 27.6 g in 0.3 g, with an average of 6.01 g.

Among debris larger than 5 mm, unretouched flakes predominated. Shatter fragments and unretouched blades were almost equally represented.

Microlithisation of production was indicated by numerous unretouched bladelets and microliths that Viktor overlooked. Micro chips created during retouching also formed an important share. Viktor overlooked these, too.

The stratigraphic mini-excavation by members of the Institute of Archaeology (IzA phase) increased the number of finds even more, especially the smallest, obtained on the basis of Viktor's exploratory excavation and re-examination of the sediments from the test trench (Table 6.4.1).

Despite the volume of excavated sediments being five times smaller, in comparison with the volume from Viktor's test trench, the number of finds rose from 2484 to 10,227, mainly because of the very precise, triple examination of the sediments. Such a method of working enabled an assessment of error in the method, which is considered very reliable, although this is not always the case.

The quality image of the collection again essentially changed (Table 6.4.2), although this did not alter the typological interpretation that the review of the sediments from Viktor's test trench had already enabled.

The weight of the new finds ranged between 73.6 g and less than 0.1 g, on average only 0.11 g.

The weight of the new cores (without their shatter fragments) ranged between 38.2 g and 0.4 g, with an average weight of 10.67 g.

tipološke razlage, ki jo je omogočil že pregled sedimentov iz Viktorjeve sonde.

Teža novih najdb se je gibala med 73,6 g in manj kot 0,1 g, povprečno pa so bile težke samo 0,11 g.

Teža novih jeder (brez njihovih razbitin) se je gibala med 38,2 g in 0,4 g, povprečno so bila težka 10,67 g.

Med odpadki, večjimi od 3 mm, so še vedno prevladovali neretušírani odbitki, sledile so razbitine, zelo malo pa je bilo neretuširanih klin (razpredelnica 6.4.3).

Mikrolitska komponenta je bila še vedno močna, čeprav se je zmanjšalo število neretuširanih klinic v primerjavi z drugimi najdbami.

Izredno se je povečalo število mikro lusk in odkruškov (od 1.097 na 8.958 ali za 716 %), kar gre pripisati večkratnemu in zato natančnejšemu pregledu spranih usedlin.

Če povzamem izsledke vseh faz sondiranj Viktorjevega spodmola, ugotovim, kar zadeva arheološke najdbe, dva gradienta. Prvega predstavlja skokovito naraščanje števila najdb, zlasti drobnih, kot posledica bolj natančnega dela. Drugega predstavlja skokovito zmanjševanje velikosti najdb, prehod iz makroskopske dimenzije v mikroskopsko, kar je razvidno iz povprečne teže najdb. Najdbe Viktorjeve faze so povprečno težke 7,95 g, najd-

Razpredelnica 6.4.1: Viktorjev spodmol: vsi kameni proizvodi.
Table 6.4.1: Viktorjev spodmol: all stone products.

Faze izkopavanj Excavation phases	Izdelki Tools	Odpadek (ves) Debris (total)	Odpadek (< 3 oz. 5 mm) Debris (< 3 or 5 mm)	SKUPAJ TOTAL
Viktor	9	164	0	173
Viktor IzA	98	2386	1097	2484
IzA	69	10 158	8958	10 227
SKUPAJ TOTAL	**176**	**12 708**	**10055**	**12 884**

Among debris larger than 3 mm, unretouched flakes still predominated, followed by shatter fragments, and there were very few unretouched blades (Table 6.4.3).

The microlithic component was still strong, although the number of unretouched bladelets fell in comparison with other finds.

The number of micro chips increased enormously (from 1097 to 8958, or by 716%), which can be ascribed to the multiple and thus more precise examination of the washed sediments.

If I summarise the results of all phases of the exploratory excavations of Viktorjev spodmol, I find, as far as the archaeological finds are concerned, two gradients. The first represents the enormous increase in the number of finds, especially small ones, as a result of the more careful work. The other represents the enormous decrease in the size of finds, the transition from macroscopic dimensions to the microscopic, which is clear from the average weight of the finds. The finds from Viktor phase have an average weight of 7.95 g, the finds from the next phase 0.34 g and the last phase 0.11 g. The largest jump (from 7.95 g to 0.34 g) is a result of the changed method of work, the smaller jump (from 0.34 g to 0.11 g) is connected with the error of the working method. This can still be very large. With the average weight of finds we can often assess how accurately the work has been carried out in the field and later in the laboratory.

Comparison of the various phases of excavations, in which different techniques and methods were used, clearly shows that an interpretation of sites which is based on finds is very dependent on the method (and accuracy) of work in the field and later in the laboratory (see Payne 1972 b).

The classical method of concurrent examination of sediments in the field without wet sieving (Viktor

Razpredelnica 6.4.2: Viktorjev spodmol: specifikacija izdelkov.
Table 6.4.2: Viktorjev spodmol: specification of products.

Faze izkopavanj Excavation phases	Praskala na odbitku Endscrapers on flake	Odbitki s prečno retušo Truncated flakes	Odbitki retuširani Retouched flakes	Kline retušuširane Retouched blades	Kline s prečno retušo Truncated blades	Kline z izjedo Notched blades
Viktor	5	2	2	0	0	0
Viktor IzA	6	3	8	8	2	2
IzA	2	0	7	7	0	0
SKUPAJ TOTAL	**13**	**5**	**17**	**15**	**2**	**2**

nadaljevanje continuation

Faze izkopavanj Excavation phases	Kljun Bec	Klinice retuširane Retouched bladelets	Mikro konice Micro points	Trikotniki Triangles	Trapezi Trapezes	Mikroliti fragmenti Microliths fragments	SKUPAJ TOTAL
Viktor	0	0	0	0	0	0	9
Viktor IzA	1	30	12	22	1	3	98
IzA	0	22	5	15	3	8	69
SKUPAJ TOTAL	**1**	**52**	**17**	**37**	**4**	**11**	**176**

Razpredelnica 6.4.3: Viktorjev spodmol: specifikacija odpadka.
Table 6.4.3: Viktorjev spodmol: specification of debris.

Faze izkopavanj Excavation phases	**Jedra Cores**	**Razbitine brez korteksa Shatter fragmnets non-cortical**	**Razbitine s korteksom Shatter fragments cortical**	**Odbitki navadni Flakes non-cortical**	**Odbitki s korteksom Flakes cortical**	**Odbitki laminarni Flakes laminar**
Viktor	17	7	32	31	61	5
Viktor IzA	13	100	57	638	276	4
IzA	14	206	86	646	163	20
SKUPAJ TOTAL	**44**	**313**	**175**	**1315**	**500**	**29**

nadaljevanje / continuation

Faze izkopavanj Excavation phases	**Kline neretuširane Blades unretouched**	**Klinice neretuširane Bladelets unretouched**	**Mikro vbadala Microburins**	**Mikro luske Micro scars**	**SKUPJ TOTAL**
Viktor	11	0	0	0	164
Viktor IzA	137	64	9	1088	2386
IzA	40	25	5	8953	10 158
SKUPAJ TOTAL	**188**	**89**	**14**	**10 041**	**12 744**

be naslednje faze 0,34 g in zadnje faze 0,11 g. Največji skok (od 7,95 g na 0,34 g) je posledica spremenjene metode dela, manjši skok (od 0,34 g na 0,11 g) pa je povezan z napako delovne metode. Ta je lahko še vedno zelo velika. S povprečno težo najdb lahko velikokrat ocenimo, kako natančno je bilo delo izvedeno na terenu in pozneje v laboratoriju.

Primerjava rezultatov različnih faz izkopavanja, v katerih so bile uporabljene različne tehnike in metode, jasno kaže, da je interpretacija najdišča, ki temelji na najdbah, zelo odvisna od načina (in natančnosti) dela na terenu in pozneje v laboratoriju (prim. Payne 1972 b).

Klasična metoda sprotnega pregledovanja usedlin na terenu brez spiranja (faza Viktor) je dala najslabši rezultat. Spregledane so bile vse najdbe, ki so ključne za solidno 'kulturološko' opredelitev najdišča.

Spiranje in rutinsko pregledovanje že odkopanih usedlin (faza Viktor in IzA) je dalo vsestransko boljši rezultat, s tem da so bile zbrane vse najdbe, ki so ključne za interpretacijo najdišča.

Še boljši rezultat je dalo mini stratigrafsko izkopavanje, spiranje in večkratno pregledovanje spranih usedlin (faza IzA), ki je na majhnem prostoru omogočilo enako interpretacijo najdišča kot izkopavanja na petkrat večjem prostoru z manjšo natančnostjo.

Če se natančnost izkopavanja (beri zbiranja najdb) še bolj zmanjša, je treba raziskati izredno velik prostor, da dobimo rezultat enakovreden raziskavi v fazi IzA. Kaj hitro se lahko zgodi, da ni zadosti celotno najdišče in da je pri reševanju arheoloških vprašanj treba raziskati še podobna najdišča. V ne tako daljni preteklosti je bil takšen način dela pri nas pravilo, po katerem sem se tudi sam slepo ravnal. Danes mi je jasno, da takšno ravnanje ne pelje nikamor.

phase) gave the worst results. All the finds which are crucial for a solid "culturological" definition of the site were overlooked.

Wet sieving and routine re-examination of already excavated sediments (Victor and IzA phase) gave all-round better results in that all finds crucial for the interpretation of the site were collected.

The mini stratigraphic excavation, wet sieving and multiple examination of the washed sediments (IzA phase) gave even better results, enabling in a small space the same interpretation as excavations on a space five times bigger with lesser accuracy.

If the accuracy of the excavation (read retrieving of finds) is even more reduced, it is necessary to investigate an extremely large space in order to obtain the result of equal value to investigations in the IzA phase. What can quickly happen is that the entire site does not suffice and in solving archaeological questions it is necessary additionally to excavate similar sites. In the not so distant past, such a method of work was the rule here, according to which I myself also blindly behaved. Today it is clear to me that such behaviour leads nowhere.

7. Razlaga orodnih tipov in armatur ter postopkov pri izdelavi orodij in armatur, najdenih v Viktorjevem spodmolu

7. Interpretation of Types of Tool and Armature and Technology of Production of Tools and Armatures Found in Viktorjev Spodmol

Ivan Turk & Matija Turk

Vprašanje, ki se pogosto zastavlja v zvezi s kamenim orodjem, je, kje je bilo izdelano. Od tega naj bi bila med drugim odvisna razlaga vrste najdišča, ki je lahko bilo ali stalno bivališče (bazno taborišče) ali občasno zatočišče (bivak).

O tem, da so v Viktorjevem spodmolu izdelovali orodja, ni dvoma. To dokazujejo tako najdbe jeder in večjih odpadkov, ki so neposredno povezani z njimi, kot zelo številne drobne luske in odkruški, ki so nastali pri oblikovanju izdelkov. Razen tega so med najdbami zastopani tudi številni polizdelki in nastavki, ki niso bili uporabljeni v nadaljnjem postopku izdelave orodij. Odločilnega pomena za odgovor na zastavljeno vprašanje so nedvomno odpadki vseh velikosti, ki smo jim doslej posvečali premalo pozornosti. Odpadki so namreč zanesljivo ostali na kraju, kjer so se opravljale določene dejavnosti, medtem ko so bili izdelki lahko odneseni in uporabljeni drugje.

Tehnologija:

Pri obdelavi surovine so bili uporabljeni trije posebni postopki, ki se pri nas pred mezolitikom niso prijeli, čeprav so bili domnevno znani že v poznem paleolitiku, kot npr. segmentiranje nastavkov in toplotna obdelava surovine za izdelovanje kamenih orodij v Ciganski jami (glej inv. št. 842: medialni segment kline, 945: krakelirana gravetka, 980: krakeliran bazalni segment kline).

- Prva posebnost je toplotna obdelava surovine v ognju. Dokaz zanjo so številni krakelirani kosi, od jeder preko polizdelkov in nastavkov do orodij. Pomembno je, da je v redkih primerih krakeliran tudi korteks, kar vsekakor potrjuje tezo o toplotni obdelavi surovine prodnika z namenom, da se izbolj-

A question that is often raised in connection with stone tools is where it was made. On this would depend, among other things, the interpretation of the type of site, which could be either a permanent residence (base camp) or occasional shelter (bivouac).

There is no doubt that tools were made in Viktorjev spodmol. This is proved both by the finds of cores and major debris directly connected with them, and the number of tiny chips which are created in shaping products. In addition, among the finds are represented numerous semi-products and blanks which were not used in the further process of making tools. Debris of all sizes is undoubtedly of decisive importance for the answer to the question raised, to which we have to date devoted too little attention. Debris, namely, certainly stayed in the place where specific activities took place, while products could be carried off and used elsewhere.

Technology:

In the working of raw materials, three individual procedures were used that before the Mesolithic were not grasped here, although they were presumably already known in the late Palaeolithic, such as segmenting blanks and thermal treatment of raw materials for making stone tools in Ciganska jama (see inv. no. 842: medial segment of a blade, 945: thermally cracked backed bladelet, 980: thermally cracked proximal segment of a blade).

- The first particularity is the thermal treatment of raw materials in fire. Evidence of this is provided by numerous thermally cracked pieces, from cores through semi-products and blanks to tools. It is important that cortex is also cracked on a few thermally cracked pieces, which certainly confirms the thesis of the thermal treatment of raw pebbles for the šajo njene fizikalne lastnosti za potrebe mehanske obdelave.

- Druga posebnost je obdelava surovine s pritiskanjem namesto z običajnim udarjanjem ali s pomočjo koščenega vmesnika. Dokaz zanjo so zelo tenki odbitki in kline, včasih ne dosti debelejši kot papir. Talon v obliki zelo sploščene krivulje normalne porazdelitve in kontrabulbus (*contre-bulbe*) kažeta na to, da so bile kline narejene ena za drugo, ne da bi se izdelovalec premaknil levo ali desno na udarni ploskvi jedra.
- Tretja posebnost je segmentiranje (lomljenje) klin(ic). Dokaz zanjo so številni fragmenti klin(ic) (t. 6: 84/8, 85/12, 87/4, 86/16).

Nekatere kline imajo na talonu izjedo (t. 6: 85/12, 86/1), druge izjedo lateralno tik nad talonom (t. 6: 84/8). Čemu so te izjede služile, nama ni znano. Vsekakor gre za posebnost, ki bi jo morda lahko povezala z izdelovanjem trapezov. Pri trapezih je krajša prečna retuša večkrat usločena (t. 5: 79/12). Usločeno prečno retušo na klini zasledimo že v poznem paleolitiku (glej Ciganska jama, inv. št. 955). Kline z izjedo na talonu se v Italiji (najdišče Romagnano III) povezujejo s kastelnovjenom (Broglio 1971, sl. 18, 1-2; Broglio 1984, sl. na str. 286: 44-45). Kline z obema načinoma umeščanja izjede so znane tudi v Franciji, med drugim v najdiščih s kastelnovjenom (Rozoy 1978b, 290, t. 204: 16, 230: 6).

Med odbitki je posebej zanimiv en odbitek tipa *Kombewa* (odbitek, narejen na odbitku, tako da ostane predhodni bulbus). Tovrstni odbitki nama z naših paleolitskih in mezolitskih najdišččih niso znani.

Surovina (sl. 7.1):

Prebivalci Viktorjevega spodmola so se oskrbovali s surovino za izdelavo kamenih orodij v bližnji okolici. Surovinska osnova so bili predvsem manjši roženčevi in tufski prodniki, velikosti oreha, iz nanosa reke Reke, saj so večji prodniki v produ in izdankih delno kremenovih konglomeratov v povirju Reke redki. Samo izjemoma so bila uporabljena tudi stara (morda paleolitska) jedra (t. 1: 6). Najbližja ležišča takšnih prodnikov so v Vremski dolini.

Prvotno izvorno področje kremenovih in drugih prodnikov so eocenski konglomerati v zgornjem toku reke Reke in njenih pritokov (sl. 7.1). Na izdanke teh konglomeratov naju je prvi opozoril A. Mihevc z Inštituta za raziskovanje krasa v Postojni. Ti prodniki so se odložili skupaj s flišem. V flišni bazen so bili transportirani iz predgorja Julijcev in izvirajo iz kamnin, ki so nastale v triasu in juri (ustni podatek S. Buserja). K. Drobne naju je opozorila, da so lahko podobni prodniki tudi v flišnih konglomeratih v spodnjem toku Reke na pobočju Vremšice in v vznožju Brkinov.

Vsekakor ni dvoma, da gre predvsem za surovino lokalnega izvora. Prisotnost večjega števila vodnih polžev

purpose of improving their physical properties for the needs of mechanical processing.

- The second particularity is the working of raw materials with pressure instead with the normal striking with a hammer or with the aid of a bone intermediary. Evidence of this is the very thin flakes and blades, sometimes not much thicker than paper. A butt in the shape of a very flattened curve of normal distribution and a *contre-bulbe* indicate that the blades were made one after another, without the maker moving left or right on the striking platform of the core.
- The third particularity is the segmented (fragmented) blade(let). Evidence of this is provided by the numerous fragments of blade(let)s (Plate 6: 84/8, 85/12, 87/4, 86/16).

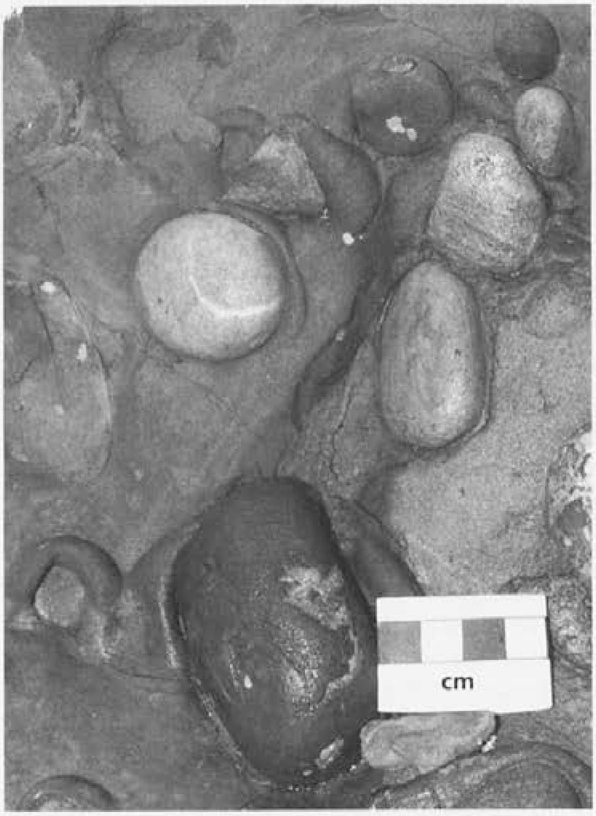
Some blades have a notch on the butt (Plate 6: 85/12, 86/1), others a notch laterally immediately above the butt (Plate 6: 84/8). We do not know for what these notches served. It is certainly a particularity which may perhaps be linked with the making of trapezes. With a trapeze, the shorter truncation is often convex (Plate 5: 79/12). A convex truncation on a blade can already be traced in the late Palaeolithic (see Ciganska jama, inv. no. 955). Blades with notches on the butt in Italy (Romagnano III site) are connected with the Castelnovian (Broglio 1971, Fig. 18, 1-2; Broglio 1984, fig. on p. 286: 44-45). Blades with both methods of inserting a notch are also known in France, among others from a site with Castelnovian finds (Rozoy 1978b, 290, Plate 204: 16, 230: 6).

Among flakes, of particular interest is one flake of the *Kombewa* type (flake made on a flake so that the previous bulb of percussion remains). Such flakes are not known in our Palaeolithic and Mesolithic sites.

Raw material (Fig. 7.1):

The inhabitants of Viktorjev spodmol supplied themselves with raw materials for making stone tools in the near vicinity. The raw material bases were mainly small chert and tuff pebbles, the size of walnuts, from the alluvium of the river Reka, since larger pebbles in the gravel and outcrops of partially calcified conglomerates at the Reka source are rare. Only exceptionally were old (perhaps Palaeolithic) cores also used (Plate 1: 6). The nearest beds of such pebbles are in the Vreme valley.

The original source of chert and other pebbles are Eocene conglomerates in the upper course of the river Reka and its tributaries (Fig. 7.1). A. Mihevc, from the Institute of Karst Studies in Postojna, first drew attention to the deposits of these conglomerates. These pebbles were deposited together with flysche. They were transported to the flysche basin from the foothills of the Julian Alps and originate from rocks of the Triassic and Jurassic age (oral data from S. Buser). K. Drobne drew attention that there could be similar pebbles in flysche



Sl. 7.1: Eocenski konglomerat s kremenovimi prodniki, Ilirska Bistrica. Foto I. Turk.
Fig. 7.1: Eocene conglomerate with chert pebbles, Ilirska Bistrica. Photo I. Turk.

v mezolitskih režnjih (glej Slapnik, ta zbornik), lahko razloživa z nabiranjem prodnikov v rekah in potokih. Polži, ki so v vodi prilepljeni na prodnike, bi na ta način lahko prišli nepoškodovani v najdišče, v katerem v holocenu zanesljivo ni bilo tekoče vode.

Kamenih artefaktov mineraloško in geokemijsko nisva mogla analizirati. Zato ne podajava običajnega surovinskega sestava, ki je podlaga za sklepanje o stikih, trgovanju ipd. Določanje različnih kremenov na oko, kot je v navadi v arheoloških krogih, se nama zdi preveč tvegano. Zato sva se mu raje odpovedala.

Kot zanimivost naj omeniva 5 fragmentov kamene strele in en fragment nožička s hrbtom iz kamene strele, vse iz mezolitske plasti (sl. 6.2.1). Kamena strela, ki velja za 'eksotično' surovino, se prvič pojavi že v mlajšem paleolitiku. V mezolitiku je dokaj običajna. Njen izvor se pogosto išče v Alpah, kar bi v tem primeru pomenilo povezavo z alpskimi predeli in trgovanje z bolj oddaljenimi kraji. Vendar je treba poudariti, da so nahajališča kamene strele praktično po celi Sloveniji (Žorž, Rečnik 1998). Zato gre lahko tudi v tem primeru le za lokalno surovino. Najbližja dobro znana nahajališča kamene strele so v okolici Cerknice in Idrije, medtem ko na Krasu za zdaj niso poznana.

conglomerates in the lower course of the Reka on the slopes of Vremšica and on the flanks of the Brkini.

There is certainly no doubt that it is mainly raw material of local origin. The presence of large numbers of water snails in Mesolithic spits (see Slapnik, this volume) can be explained by the collection of pebbles in rivers and streams. The snails, which were attached to pebbles in the water, could thus have been brought undamaged to the site, in which there was certainly no running water in the Holocene.

We have not been able to analyse the stone artefacts minerologically and geochemically. So the normal raw material composition, which is the basis for conclusions about contacts, trade etc. is not available. Identifying different cherts by eye, as is the custom in archaeological circles, seems to us too risky. We would therefore rather not reach conclusions.

As a curiosity, let us mention 5 fragments of rock crystal and one fragment of a backed bladelet from the same rock, all from the Mesolithic layer (Fig. 6.2.1). Rock crystal, which is an 'exotic' raw material, first appears in the Late Palaeolithic. It is fairly common in the Mesolithic. Its origin is often sought in the Alps, which in this case would mean a link with Alpine areas and trade with more distant places. However, it must be stressed that rock crystal can be found practically throughout Slovenia (Žorž, Rečnik 1998). It, too, could therefore be of local origin. The nearest well-known sites for rock crystal are in the vicinity of Cerknica and Idrija, while they are not for the moment known on the Karst.

Cores (Plates 1: 1-7, 8/5,9/5; 2: 10-12, 5: 69/10, 70/10, 71/12, 72/15, 73/15):

The cores are almost all small because the pebbles used were also small. Very small potential cores are a peculiarity (Plates 1: 7; 5: 77/16).

There are few cores with visible blade or bladelet scars. This does not accord with the large number of blades and bladelets. However it could be interpreted as meaning that the majority of the cores belong to the last phase of use, when only flakes could still be obtained from them.

Occasional remains of all phases of use of cores are present at the site. There are practically no whole pebbles. There are many shatter fragments of pebbles, which appeared unusable and were thus immediately rejected. Exceptionally, there were used old cores (Plate 1: 6). There were no prenucleuses, but flakes with traces of the initial working of the pebbles were preserved (Plate 2: 11-12; Plate 5: 74/15). Eight fragments were also found which had been created in rejuvenating existing cores (Plate 2: 10). A large number of cortical flakes or flakes with cortex also exist. All this indicates a workshop for stone tools which was in the overhang cave and not elsewhere.

Jedra (t.1: 1-7, 8/5,9/5; 2: 10-12, 5: 69/10, 70/10, 71/12, 72/15, 73/15):

Jedra so skoraj vsa majhna, ker so bili majhni tudi uporabljeni prodniki. Posebnost so zelo majhna potencialna jedra (t. 1: 7; 5: 77/16).

Jeder z vidnimi negativi klin in klinic je malo. To se ne sklada z velikim številom klin in klinic. Vendar se da razložiti s tem, da večina jeder pripada zadnji fazi izrabe, ko so bili od njih lahko odbiti samo še odbitki.

V najdišču so prisotni redki ostanki vseh faz izrabe jeder. Celih prodnikov praktično ni. Veliko je razbitin prodnikov, ki so se izkazali za neuporabne in so bili kot taki takoj zavrženi. Izjemoma so bila uporabljena stara jedra (t. 1: 6). Predhodnih jeder (*prenukleusov*) ni, pač pa so se ohranili njihovi odbitki s sledovi začetne obdelave prodnikov (t. 2: 11-12; t. 5: 74/15). Najdenih je bilo tudi vsaj 8 odbitkov, ki so nastali pri popravljanju obstoječih jeder (t. 2: 10). Obstaja tudi veliko robnih odbitkov oz. odbitkov s korteksom. Vse to kaže na delavnico kamenih orodij, ki je bila v spodmolu in ne drugje.

Jedra so vseh mogočih oblik: enopolarna (t. 1: 6, 8/5; 3: 73/15), piramidalna (t. 1: 2; 5: 77/16), prizmatična (t. 1: 1; 5: 70/10, 72/15), navzkrižna (*nucléus ŕ enlčvements croisés*) (t. 1: 5, 9/5), kroglasta (t. 3: 69/10), diskasta (t. 1: 3, 4, 7), na odbitku (t. 3: 71/12) in druga posebna jedra. Veliko je neizoblikovanih jeder, ki se ne dajo umestiti v nobeno poznano skupino. Med najpogostejšimi so piramidalna jedra.

Neobičajna so jedra brez prave udarne ploskve, pri katerih to ploskev nadomešča rob izbočene površine jedra. Rob, namenjen odbijanju, imajo predvsem navzkrižna jedra in jedra na odbitku.

Neretuširane kline in klinice:

Neretuširane kline in klinice so predstavljale pomemben del nastavkov za izdelavo orodij. V nasprotju z odbitki je bila večina klin in klinic domnevno uporabljena v nadaljnjem postopku obdelave nastavkov. Zato in zaradi drugih razlogov je njihovo število v primerjavi z neretuširanimi odbitki majhno.

Velika večina klin in klinic je fragmentiranih, domnevno namenoma. Segmentiranje (lomljenje) večjih kosov je bilo v mezolitiku splošno in pogosto (t. 6: 87/4). Izvajalo se je tudi in predvsem brez predhodne izjede (t. 5: 81/6, 82/10), ki je omogočala bolj nadzorovano lomljenje s tako imenovano "mikrovbadalno" tehniko.

Večina najdenih fragmentov pripada bazalnemu delu klin in klinic, kar lahko pomeni, da so bili sredinski (medialni) in končni (terminalni) deli uporabljeni za izdelavo orodij in lovskih pripomočkov.

Bazalni in drugi deli klin in klinic so praviloma zelo tenki. Talon je gladek ali fasetiran in ima zaradi kontrabulbusa pogosto obliko zelo sploščene krivulje normalne porazdelitve.

The cores are all possible types: unidirectional (Plates 1: 6, 8/5; 3: 73/15), pyramidal (Plates 1: 2; 5: 77/16), prismatic (Plates 1: 1; 5: 70/10, 72/15), cores with crossed blank removals (*nucléus à enlèvements croisés*) (Plate 1: 5, 9/5), spherical (Plate 3: 69/10), discus shaped (Plate 1: 3, 4, 7), on flakes (Plate 3: 71/12) and other special cores. There are a lot of unformed cores which cannot be placed in any known group. Pyramidal cores are among the most frequent.

There are unusual cores without a real striking platform, by which this platform is replaced by the edge of the convex surface of the core. Cores with crossed blank removals and cores on flakes mainly have edges intended for striking.

Unretouched blades and bladelets:

Unretouched blades and bladelets represented an important part of blanks for the making of tools. In contrast with flakes, the majority of blades and bladelets were presumably used in the further process of modifying blanks. For this and other reasons, there are few of them in comparison with unretouched flakes.

The large majority of blades and bladelets are fragmented, presumably intentionally. Segmenting (fragmenting) larger pieces was general and common in the Mesolithic (Plate 6: 87/4). It was also mainly carried out without a previous notch (Plate 5: 81/6, 82/10), which enabled better control of the fracturing with the so-called "microburin" technique.

The majority of fragments found belong to the proximal part of blades and bladelets, which means that the medial and distal parts were used for the manufacture of tools and hunting devices.

Proximal and other parts of blades and bladelets are generally very thin. The butt is plane or faceted and because of the negative bulb of percussion (*contre-bulbe*) often has the shape of a very flattened curve of normal distribution.

The style of blades and bladelets is important, but is very difficult to judge because of the great fragmentation. The general impression is that blades and bladelets were fairly irregular. Specimens with straight, parallel edges and ridges or ridge are rare. Seventy-five percent of blades and bladelets have two dorsal scars, 25% have three. It is significant that also among blades there are a considerable number with three dorsal scars.

"Microburins" (Plates 2: 21; 5: 81/6, 82/10):

Microburins, just like cores and unretouched flakes, represent debris in the process of working the raw materials. In addition to ordinary shapes (Plates 2: 21; 5: 81/6, 82/10), of various sizes, small fragments diagnostic of the microburin technique were also found. There were no burins of the *Krukowski* type among them, Pomemben je stil klin in klinic, ka pa ga je zaradi velike fragmentarnosti težko oceniti. Splošen vtis je, da so bile kline in klinice precej nepravilne. Primerki z ravnima, vzporednima robovoma in grebenom oz. grebeni so redki. Klin in klinic z dvema dorzalnima ploskvama je 75 %, takšnih s tremi pa 25 %. Pomembno je, da je tudi med klinicami kar precej takšnih, ki imajo tri dorzalne ploskve.

"Mikro vbadala" (t. 2: 21; 5: 81/6, 82/10):

Mikro vbadala predstavljajo tako kot jedra ter neretuširani odbitki in kline odpadek v procesu obdelave surovine. Poleg običajnih oblik (t. 2: 21; 5: 81/6, 82/10) različnih velikosti so bili najdeni tudi majhni odlomki, diagnostični za mikrovbadalno tehniko. Med njimi ni nobenega vbadala tipa *Krukowski*, morda z izjemo enega atipičnega (Rozoy 1978b, 66). Razumljivo je, da je mikro vbadal (odpadkov) več kot trapezov (izdelkov).

Vbadala:

Presenetljivo je dejstvo, da v Viktorjevem spodmolu ni vbadal, pa tudi vbadalni odbitki so prej izjema kot pravilo. Če izločiva t. i. mikro vbadala, so vbadala redkost tudi v bljižnjem najdišču Pod Črmukljo (Brodar 1992, 25, t. 3-4). Isto velja za M. Triglavco, ne pa tudi za Breg (Frelih 1986, 27). Splošno gledano so vbadala v mezolitiku redka in malo pomembna (G.E.E.M. 1972, 331s).

Izjede in zobci (t. 6: 83/6, 84/8, 85/12):

Kline z izjedami in/ali zobci so prava redkost. Posebej morava omeniti en primerek klinice tipa Montbani (t. 6: 83/6). V dveh primerih je izjeda na odbitku. V enem primeru so na odbitku zobci. Pogostna posebnost je izjeda na talonu ali tik ob talonu kline (t. 6: 84/8, 85/12). Misliva, da slednje ne smemo zamenjati z izrobo.

Kljun (t. 2: 23):

Kljun je en sam, narejen na odbitku s kombiniranjem prečne retuše in izjede (t. 2: 23).

Praskala (t. 2: 13-17; 5: 75/10, 76/13, 77/16):

Praskala so najbolj variabilna skupina orodij, ki lahko šteje več sto oblik. Značilno za naša praskala je, da so narejena na odbitkih in da imajo nizko čelo (t. 2: 13-17; 5: 75/10, 76/13). Samo eno praskalo je gredljasto oziroma z visokim čelom. Med praskala z visokim čelom bi lahko uvrstila tudi eno mini praskalo v obliki jedra (t. 5: 77/16). Zanj ni popolnoma jasno, ali je jedro ali praskalo. Prav tako ni jasno ali je en primerek nazobčano praskalo ali jedro.

with the possible exception of an atypical one (Rozoy 1978b, 66). It is understandable that there are more microburins (debris or by-products) than trapezes (products).

Burins:

The fact that there were no burins in Viktorjev spodmol is surprising. Even burin spalls were more the exception than the rule. If we exclude so-called microburins, burins were also an exception in the nearby site of Pod Črmukljo (Brodar 1992, 25, Plates 3-4). The same applies for M. Triglavca, but not also Breg (Frelih 1986, 27). In general, burins are rare and of little importance in the Mesolithic (G.E.E.M. 1972, 331s).

Notches and denticulates (Plate 6: 83/6, 84/8, 85/12):

Blades with notches and/or denticulates are a real rarity. One specimen of a Montbani type bladelet must be mentioned individually (Plate 6: 83/6). In two cases, there is a notch on a flake. In one case, there are denticulates on a flake. A common peculiarity is a notch on the butt or right beside the butt of a blade (Plate 6: 84/8, 85/12). We believe that the latter cannot be mistaken for a shoulder.

Bec (Plate 2: 23):

There is only one bec, made on a flake with a combined truncation and notch (Plate 2: 23).

Endscrapers (Plates 2: 13-17; 5: 75/10, 76/13, 77/16):

Endscrapers are the most variable group of tools, with more than a hundred shapes. It is characteristic of our endscrapers that they are made on flakes and have a low frontal end (Plates 2: 13-17; 5: 75/10, 76/13). Only one endscraper is carinated or with a high frontal end. One mini endscraper in the shape of a core could also be ranked among endscrapers with a high frontal end (Plate 5: 77/16). It is not entirely clear whether it is an endscraper or a core. It is similarly unclear whether one specimen is a denticulate endscraper or core.

There are no explicit types among the endscrapers, so that in certain cases we can only talk about similarities with "ungiform" (Plate 2: 16) and nosed endscrapers (Plates 2: 13; 5: 75/10, 76/13). Generally speaking, endscrapers are not an important part of the inventory of Viktorjev spodmol, nor do they have particular importance for the chronological and typological classification of the entire material, since they belong in the group of general tools.

Med praskali ni izrazitih tipov, tako da lahko v določenih primerih govoriva le o podobnosti z nohtastim (t. 2: 16) in gobčastim praskalom (t. 2: 13; 5: 75/10, 76/13). Splošno vzeto praskala niso ravno pomemben del inventarja Viktorjevega spodmola, niti nimajo posebnega pomena za kronološko-tipološko opredeljevanje celotnega gradiva, saj sodijo v t. i. skupino splošnih orodij.

Retuširani odbitki (t. 2: 18-19):

Retuširani odbitki predstavljajo tako kot retuširane kline neznaten in nepomemben delež v kamenem inventarju najdišča. Med njimi so tudi mikrolitski primerki, domnevno opremljeni s prečno retušo.

V skupino retuširanih odbitkov se uvrščajo tudi strgala (G.E.E.M. 1975, 327).

Štirje odbitki so prečno retuširani (t. 2: 18-19). Vsaj dva izmed njih bi lahko uvrstila tudi med orodja vrste "skrobacz" (t. 2: 19), kar v poljščini pomeni strgalo, strgačo (Broglio, Kozłowski 1983, 105, sl. 8: 1-5).

V italskem mezolitiku so retuširani odbitki številnejši, razen tega se jim pripisuje določena vloga pri kronotipološkem opredeljevanju mezolitskih inventarjev (Broglio, Kozłowski 1983, 121, sl. 26).

Retuširane kline in klinice (t. 2: 24, 26-31; 3: 32, 34, 35; 6: 89/14, 90/16):

Enih in drugih ni veliko. Skoraj vse so fragmentirane. Posamezni fragmenti lahko pripadajo tudi geometričnim oblikam. Prevladujejo primerki s hrbtom (strma retuša). Vendar so tudi drugače retuširani kosi: z uporabno retušo (redki), drobtinčasto retušo na enem robu, običajno skupaj s hrbtom (pogosti) in polstrmo retušo. Dve fragmentirani klini sta rahlo poševno prečno retuširani v ravni črti. Ni izključeno, da sta pripadali nekemu geometrijsko oblikovanemu orodju.

Klinice s hrbtom, ki imajo drugi rob drobtinčasto retuširan (enostavna marginalna retuša), ali neretuširan, so med pogostejšimi orodji (t. 2: 24, 26-31; 6: 89/14, 90/16). Ker so vse fragmentirane, je oznaka klinica s hrbtom izhod v sili. Dejansko gre lahko za dele različnih mikrolitskih orodij.

Posebna skupina so klinice z dvojnim hrbtom in z izrobo (t. 3: 32, 34, 35) ali s pecljem (t. 3: 33, 36). Takšna mikrolitska orodja nama niso znana s tujih in naših mezolitskih najdišč. Vsekakor pa niso povsem neznana v povečani obliki na naših in drugih najdiščih poznega paleolitika (Brodar 1991, t. 18: 26-35; 1995, t. 6: 18, 156).

Trapezi (t. 2: 20; 5: 78/10, 79/12, 80/16):

Trapezi sodijo med redke najdbe v Viktorjevem spodmolu. Razdeliva jih lahko na asimetrične (neenakokrake) dolge (t. 2: 20; 5: 79/12) in asimetrične kratke (t. 5: 78/10). Skoraj vsi so bili narejeni z "mikrovbadal-

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Retouched flakes (Plate 2: 18-19):

Retouched flakes, like retouched blades, represent an unremarkable and unimportant share of the stone inventory of the site. There are also microlithic specimens among them, presumably fitted with a truncation.

Scrapers also belong in the group of retouched flakes (G.E.E.M. 1975, 327).

Four flakes are truncated (Plate 2: 18-19). At least two of them could also be classified among tools of the "skrobacz" type (Plate 2: 19), which means scraper in Polish (Broglio, Kozłowski 1983, 105, Fig. 8: 1-5).

Retouched flakes are more numerous in the 'Italic' Mesolithic, and they have a specific role in the chronotypological classification of 'Italic' Mesolithic assemblages (Broglio, Kozłowski 1983, 121, Fig. 26).

Retouched blades and bladelets (Plates 2: 24, 26-31; 3: 32, 34, 35; 6: 89/14, 90/16):

There are not many of either. Almost all are fragmented. Individual fragments may also belong to geometric forms. Backed specimens predominate. However, there are also differently retouched pieces: with use wear (rare), marginal retouch on one edge, normally in combination with an abrupt retouch (frequent) and semi-abrupt retouch. Two fragmented blades are slightly obliquely truncated in a straight line. It cannot be excluded that they belonged to some geometrically designed tool.

Backed bladelets, which have a simple marginal retouch on the other edge, or unretouched, are among the commonest tools (Plates 2: 24, 26-31; 6: 89/14, 90/16). Since they were all fragmented, the term backed bladelet is used *in extremis*. Actually, they could be parts of various microlithic tools.

Double backed bladelets with a shoulder (Plate 3: 32, 34, 35) or a stem (Plate 3: 33, 36) are a special group. Such microlithic tools are unknown to us from foreign and our own Mesolithic sites. However, they are not unknown in enlarged form in Slovene and other sites from the Late Palaeolithic (Brodar 1991, Plate 18: 26-35; 1995, Plate 6: 18, 156).

Trapezes (Plates 2: 20; 5: 78/10, 79/12, 80/16):

Trapezes are among occasional finds in Viktorjev spodmol. They can be divided into elongated asymmetric (non-isosceles) (Plate 2: 20; 5: 79/12) and asymmetric short (Plate 5: 78/10). Almost all were made with the "microburin" technique. The *piquant-trièdre* on the longer truncated side is often fractured. Despite a review of all the micro debris, we did not find the broken *piquant-trièdre*. The shorter, truncated side could have been made in a similar way to the longer one, i.e., with a notch and fracturing (Plate 2: 20), although this is not usual, since a great deal of data suggests retouch along a snap fracture. The shorter, truncated side is always convex.

no" tehniko. Triroba konica (*piquant-trièdre*) na daljši prečno retuširani stranici je večkrat odlomljena. Odlomjenih trirobih konic kljub pregledu vseh mikro odpadkov nisva našla. Krajša, prečno retuširana stranica je bila lahko narejena na podoben način kot daljša, tj. z izjedo in prelamljanjem (t. 2: 20), čeprav to ni običajno, saj veliko podatkov govori za retušo ob navadnem prelomu. Krajša, prečno retuširana stranica je vedno usločena.

Vsi trapezi so relativno veliki, vendar je med njimi tudi en zelo majhen primerek, ki žal ni cel (t. 5: 80/16).

Glede na usmerjenost daljše prečne retuše razlikujeva leve (t. 2: 20) in desne trapeze (t. 5: 79/12). Levi trapezi prevladujejo nad desnimi, kar je značilno za južno Evropo (Löhr 1994). Podobno je v M. Triglavci, kjer razpolagamo s trenutno največjo zbirko trapezov v Sloveniji.

Klinice s hrbtom in prečno retušo (*dos et troncatures*) (t. 3: 37-50; 6: 92/13-101/7; 7: 102/15-104/17):

Klinica s hrbtom in prečno retušo (skrajšano: hrbet in prečna retuša) sodi med najpomembnejša mezolitska orodja v Viktorjevem spodmolu (t. 3: 37-50; 6: 92/13-101/7; 7: 102/15-104/17), Mali Tiglavci in verjetno tudi v najdišču Pod Črmukljo.

Klinice s hrbtom in prečno retušo zaradi enostavnosti nisva ločevala od trikotnikov. Zato jih v razpredelnicah običajno navajava skupaj z njimi, podobno kot je to storil M. Brodar (1992). S tipološkega stališča to ni ravno pravilno, je pa praktično, saj je zlasti pri fragmentiranih kosih težko potegniti mejo med trikotnikom ter hrbtom in prečno retušo. To je še toliko težje, ker pri nas najdeni primerki klinic s hrbtom in prečno retušo niso tipični, razen ene izjeme v M. Triglavci (glej Turk *et al.*, ta zbornik).

V tabelah sva trikotnike orientirala drugače kot hrbte in prečne retuše, ki imajo prečno retušo vedno zgoraj (glej tudi objave italijanskih avtorjev, ki tudi niso vedno enotni).

Hrbet je praviloma enojen, tj. samo na enem robu. Samo v enem primeru je hrbet dvojen, tj. na obeh robovih (t. 6: 92/13). Sodeč po nedoločljivih fragmentih z dvojnim hrbtom (t. 6: 91/5), bi lahko bilo kosov z dvojnim hrbtom in prečno retušo celo več. V to skupino bi lahko sodil tudi nenavaden primerek št. 44 na t. 3, ki ima namesto drugega hrbta naraven rob. Rob nasproti hrbta je bodisi neretuširan (t. 3: 39, 43, 46; 6: 95/15, 96/7, 100/169) bodisi delno ali v celoti retuširan z direktno drobtinčasto (t. 3: 37, 40-41, 48; 6: 93/2, 97/2, 98/14, 99/11) ali polstrmo retušo (t. 6: 94/16). Drobtinčasta retuša ne prizadene ostrine roba.

Prečna retuša je vedno bolj ali manj poševna, vendar ne toliko, da bi lahko govorila o konici. Primerki z vodoravno prečno retušo niso znani. Prečna retuša se dviguje vedno od leve proti desni, razen v enem primeru, ko je obratno (t. 7: 104/17). To se dobro ujema z daljšo

All trapezes are relatively large, although there is one very small specimen among them, which is unfortunately not whole (Plate 5: 80/16).

Depending on the orientation of the longer truncation, we distinguish left (Plate 2: 20) and right trapezes (Plate 5: 79/12). Left trapezes predominate over right ones, which is characteristic of southern Europe (Löhr 1994). It is similar in M. Triglavca, from where we have available currently the largest collection of trapezes in Slovenia.

Backed and truncated bladelets (*dos et troncatures*) (Plates 3: 37-50; 6: 92/13-101/7; 7: 102/15-104/17):

Backed and truncated bladelets are among the most important Mesolithic tools inViktorjev spodmol (Plates 3: 37-50; 6: 92/13-101/7; 7: 102/15-104/17), Mala Tiglavca and probably also Pod Črmukljo.

Backed and truncated bladelets, because of simplification, have not been distinguished from triangles. So they are normally given in the tables together, as M. Brodar (1992) did. From a typological point of view, this is not really correct, but it is practical since, especially with fragmented pieces, it is difficult to draw the boundary between triangles and backed and truncated bladelets. This is even more difficult here because the specimens of backed and truncated bladelets found are not typical, with the exception of one from M. Triglavca (see Turk et al., this volume).

In the tables, we oriented triangles differently from backed and truncated bladelets, which always have the truncation upwards (see also publications of Italian authors, which are also not always uniform).

The abrupt retouch is generally unilateral, i.e., only on one edge. Only in one case is the abrupt retouch bilateral, i.e., on both edges (Plate 6: 92/13). Judging by unidentified double backed fragments (Plate 6: 91/5), there could be even more double backed and truncated pieces. No. 44 in Plate 3 is an unusual specimen, having a straight naturally blunt edge instead of a second back, and could also belong in this group. The edge opposite the back is either unretouched (Plates 3: 39, 43, 46; 6: 95/15, 96/7, 100/169), or partially or even entirely retouched with direct marginal retouch (Plates 3: 37, 40-41, 48; 6: 93/2, 97/2, 98/14, 99/11) or semi-abruptly retouched (Plate 6: 94/16). The marginal retouch does not affect the sharpness of the edge.

The truncation is always more or less oblique, though not so much that it is possible to talk of a point. Specimens with a horizontal truncation are not known. The truncation always rises from left to right, except in one case, when it is the reverse (Plate 7: 104/17). This is well captured by the longer truncation on trapezes. Such an orientation of the truncation is the only sign of standardisation of products, which otherwise vary considerably in shape. Unfortunately, we did not prečno retušo na trapezih. Takšna usmerjenost prečne retuše je edini znak standardizacije izdelka, ki po obliki sicer precej variira. Za ugotavljanje variabilnosti hrbtov in prečne retuše s pomočjo tipometrije žal nimava dovolj velikega homogenega vzorca (glej Barbaza *et al.* 1991, 171 ss). Zato to prepuščava bodočim raziskovalcem Viktorjevega spodmola.

Nekateri hrbti so narejeni s pravo gravetno retušo in se od gravetjenskih izdelkov razlikujejo samo po natančnejši izdelavi retuše in po obliki izdelkov. Če gre za fragmente, se ne dajo ločiti od gravetjenskih izdelkov.

Trikotniki (t. 4: 52-58; 7: 105/13, 106/15, 107/10):

Trikotniki sodijo poleg trapezov in krožnih segmentov med najbolj značilna mezolitska orodja iz skupine geometrijskih orodij (armatur).

Viktorjev spodmol se ravno ne odlikuje po številu trikotnikov v ožjem pomenu besede, saj jih je presenetljivo malo. Večinoma gre za dvomljive fragmentirane primerke in redke cele kose. Raznostranični trikotniki močno prevladujejo nad enakokrakimi. To je v Italiji značilno za mlajši mezolitik (kastelnovjen). Med enakokrake trikotnike lahko zanesljivo umestiva en sam primerek (t. 7: 105/13).

Značilni so hipermikrolitski primerki trikotnikov (t. 4: 53, 57, 58, 7: 107/10).

Nekateri trikotniki imajo delno ali v celoti retuširano tretjo stranico. Retuša je bodisi drobtinčasta, (t. 7: 106/15) bodisi polstrma marginalna (t. 4: 57-58). Pri prvi ostrina roba ni prizadeta, pri drugi pa je.

Segmenti (t. 4: 51):

Krožni segmenti so v Viktorjevem spodmolu zastopani samo domnevno. Pripada jim lahko en sam fragment, za katerega ni jasno, ali gre za segment ali za hrbet v povezavi s prečno retušo (t. 4: 51).

Mikro konice (t. 4: 59-68; 7: 108/16, 109/16, 110/11, 111/11, 112/12, 113/14):

Mikro konice so značilen mezolitski inventar. V Viktorjevem spodmolu so dokaj bogato zastopane, in sicer tako po številu kot po oblikah. Kaže, da prevladujeta dve obliki: čolničasta (t. 4: 59-61) in igličasta (t. 4: 62, 65, 67). Potem je tu še enojna (enokoničasta) in dvojna (dvokoničasta) konica z enojnim ali dvojnim hrbtom.

Dvojna konica z dvojnim hrbtom je zelo podobna sovterski konici (*point de Sauveterre*), ki ima glede na retušo vrsto različic (G.E.E.M. 1972).

Dvojna konica z dvojnim hrbtom je ena sama (t. 4: 62). Več je enojnih konic z dvojnim hrbtom (t. 4: 65-67; 7: 111/11).

Med konicami so tudi hipermikrolitske (t. 7: 113/

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have a large enough homogenous sample to establish the variability of backed and truncated bladelets with the aid of typometry (see Barbaza et al. 1991, 171 ss). We therefore leave this to future researchers of Viktorjev spodmol.

Some of the backed pieces are made with a real gravette retouch and differ from Gravettian products only by the more precise retouching and its shape. Fragments cannot be distinguished from those of Gravettian origin.

Triangles (Plate 4: 52-58; 7: 105/13, 106/15, 107/10):

Triangles, together with trapezes and circular segments are among the most typical Mesolithic tools from the group of geometric tools (armatures).

Viktorjev spodmol is not distinguished in terms of the number of triangles in the narrower sense of the word, since there are surprisingly few. The majority are suspected fragmented specimens, with only occasional whole pieces. Scalene triangles greatly predominate over isosceles ones. In Italy this is typical of the Late Mesoltihic (Castelnovian). Only one specimen can be reliably placed among isosceles triangles (Plate 7: 105/13).

Hypermicrolithic specimens of triangles are characteristic (Plates 4: 53, 57, 58, 7: 107/10).

Some triangles have a partial or entirely retouched third side. The retouch is either marginal (Plate 7: 106/15), or semi-abrupt marginal (Plate 4: 57-58). With the former, the sharpness of the edge is not affected, with the latter it is.

Segments (Plate 4: 51):

Circular segments are only putatively represented in Viktorjev spodmol. One fragment only may belong to them, for which it is not clear whether it is a segment or a backed piece in connection with a truncation (Plate 4: 51).

Micropoints (Plates 4:59-68; 7: 108/16, 109/16, 110/11, 111/11, 112/12, 113/14):

Micropoints are characteristic of the Mesolithic inventory. They are fairly richly represented in Viktorjev spodmol, in terms of both number and shape. Two shapes appear to predominate: navicular (Plate 4: 59-61) and elongated (Plate 4: 62, 65, 67). Here there are additionally microunipoints and microbipoints, with uni- or bilateral abrupt retouch.

A micro double-backed bipoint is very similar to a Sauveterrian point (*point de Sauveterre*), which has a series of variants in relation to the retouch (G.E.E.M. 1972).

There is only one double-backed bipoint (Plate 4: 62) and more numerous double-backed points (Plate 4: 65-67; 7: 111/11).

There are also hypermicroliths among the points

14) in takšne, ki imajo poškodbe, značilne za izstrelke (t. 7: 110/11).

Domnevava, da je dvojna igličasta mikro konica služila za trnek, tako da je bila na sredini pritrjena na vrvico. Domneva je podprta z ostanki sladkovodnih rib, najdenih v plasteh spodmola (glej Paunović v tem zborniku).

S konicami sva izčrpala repertoar mezolitskih kamenih orodij, najdenih v Viktorjevem spodmolu.

Neopredeljeni mikroliti (sl. 7.2):

V to skupino sva uvrstila številne fragmente mikrolitskih orodij, ki se niso dali podrobneje zanesljivo opredeliti.

Koščena orodja (t.7: 114/15, 115/9, 116-118):

Koščena orodja so vsa fragmentirana. V štirih primerih gre za odlomke zelo majhnih orodij, morda šivank ali igel (t. 7: 114/15, 115/9, 116-118). Del orodja sta lahko bila tudi en odlomek močno zglajenega parožka jelena in en odlomek parožka srnjaka.

Med pregledanim osteološkim materialom je bilo med določljivimi ostanki navadnega jelena 15 % majhnih fragmentov rogovja. Takšen delež ostankov rogovja kaže na to, da je bilo rogovje pomembna surovina za izdelovanje različnih orodij. Orodja iz rogovine so bila skupaj z majhnimi odpadki najdena v večjem številu v M. Triglavci (Leben 1988 in Turk I. &Turk M., Toškan & Dirjec v tem zborniku).

Razne najdbe:

Med raznimi najdbami sta dva podolgovata brusna kamna iz peščenjaka. Eden je bil najden v Viktorjevi sondi, drugi v režnju 5. Od režnja 7 navzdol so bili najdeni posamezni koščki surove okre. V režnju 2 je bil en obroček (lahko naraven), premera 1 mm. V režnju 3 je bil 1 cm velik kortikalni odbitek, ki ima na ventralni strani šest vzporednih globokih zarez, po tri in tri skupaj. Odbitek je odlomljen vzdolž zadnje zareze. Zato bi bili urezi, ki se običajno razlagajo kot okras, lahko namenjene tudi segmentiranju.

V različnih režnjih je bil en cel morski polž in nekaj naluknjanih, ki so obdelani posebej (glej Mikuž, ta zbornik).

(Plate 7: 113/14) and those that have damage charactistic of projectiles (Plate 7: 110/11).

We suspect that the elongated microbipoint served as a hook, in such a way that it was attached to a line in the centre. The suspicion is supported by the remains of freshwater fish, found in layers of the overhang cave (see Paunović in this volume).

With points we have exhausted the repertoire of Mesolithic stone tools found in Viktorjev spodmol.

Undetermined microliths (Fig. 7.2):

We have included in this group numerous fragments of microlithic tools that cannot be determined reliably in more detail.

Bone tools (Plate7: 114/15, 115/9, 116-118):

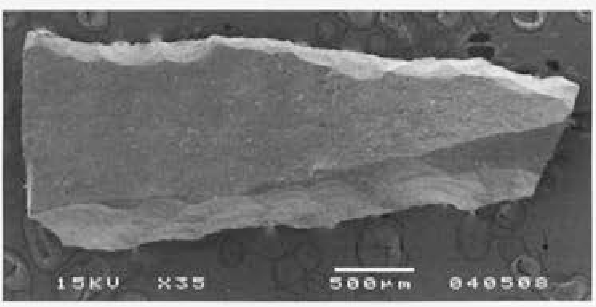
All the bone tools are fragmented. In four cases they are fragments of very small tools, perhaps needles or pins (Plate 7: 114/15, 115/9, 116-118). One fragment of strongly polished red deer antler tip and a fragment of roe deer antler tip may also be parts of tools.

Among the osteological material examined, 15% of the identifiable remains of ordinary red deer, were fragments of antlers. Such a share of the remains of antlers indicates that antlers were an important raw material for the manufacture of various tools. Tools from antler, together with small debris, were found in largest number in M. Triglavca (Leben 1988 and Turk I. & Turk M., Toškan, Dirjec in this volume).

Various finds:

Among the various finds are two longitudinal whetstones from sandstone. One was found in Viktor's test trench, and the other in spit 5. From spit 7 downwards, individual pieces of raw ochre were found. There was a band in spit 2 (perhaps natural) with a diameter of 1 mm. In spit 3 there was a 1 cm cortical flake that had four parallel cuts on the ventral side, in groups of three. The flake is broken across the ultimate cut. The cuts, which are normally interpreted as decoration, may therefore have served for segmentation.

In various spits there was one whole shell of a marine gastropod and several perforated ones, which are treated separately (see Mikuž, this volume).



Sl. 7.2: Odlomek domnevnega hipermikrolitskega svedra. Foto F. Cimerman.

Fig. 7.2: Fragment of supposed hypermicrolithic borer. Photo F. Cimerman.

8. Primerjave mezolitskih najdb v Viktorjevem spodmolu z izbranimi najdišči

8. Comparisons of Mesolithic Finds in Viktorjev Spodmol with Selected Sites

Ivan Turk

Primerjalna metoda je standardna pri arheološki obdelavi gradiva. Zato sem glavne sklope mezolitskih najdb iz Viktorjevega spodmola primerjal s podobnimi sklopi najdb v domačih najdiščih (Breg, Pod Črmukljo in M. Triglavco) ter bližnjimi in bolj oddaljenimi italijanskimi najdišči (Pečina na Leskovcu - *Grotta Azzurra*, Stenašca - *Grotta dell'Edera*, obe na Tržaškem krasu in Romagnano III v Trentski kotlini). Pri tem sem se oprl na geografski prostor (v danem primeru je to mediteransko in submediteransko območje), ki predstavlja močan povezovalni dejavnik ne glede na čas.

Primerjave z najdišči severno od Alp se mi ne zdijo smiselne, ker gre tam očitno za drugačna kulturna okolja, ki so izšla iz drugačnih osnov, razen redkih izjem, ki se lahko razlagajo tudi kot vplivi iz Sredozemlja, tj. sovterjenskega kompleksa (Kozłowski 1981). Takšna je npr. t. i. skupina Sered' na Slovaškem, ki jo je J. Barta (1972, 1980) najprej povezoval s tardenoazjenom, pozneje pa s sovterjenom. Mikrolitske armature te skupine so dejansko zelo podobne mikrolitskim armaturam v slovenskih in italijanskih mezolitskih najdiščih, zlasti mlajših, pa tudi armaturam v sredozemskem delu Francije, vse do Atlantika med Centralnim masivom in Pireneji.

Na vseh primerjanih najdiščih so bile odkopane in obdelane majhne površine (0,4 m²-8 m²). Razlike med raziskanimi površinami in posledično med prostornino sedimentov, ki so vsebovali najdbe, so dovolj velike, da lahko vplivajo na mednajdiščno variabilnost posameznih sklopov najdb.

Prostorsko variabilnost najdb sem natančneje proučil na primeru iz Divjih bab I, kjer imam za takšno proučevanje ustrezno zbrane podatke. Ti se sicer nanašajo na različne najdbe jamskega medveda, vendar je vprašanje prostorske variabilnosti podobno kot pri arheoloških ostankih. Krivulje porazdelitve posameznih najdb, dobljene z enakomernim večanjem raziskanega volumna sedimentov in njegove površine, imajo različne oblike in se med seboj križajo (sl. 8.1 a). Vse to vpliva na to, da se razmerja med posameznimi najdbami spreminjajo, odvisno od raziskanega volumna in površine sedimentov (sl. 8.1 b).

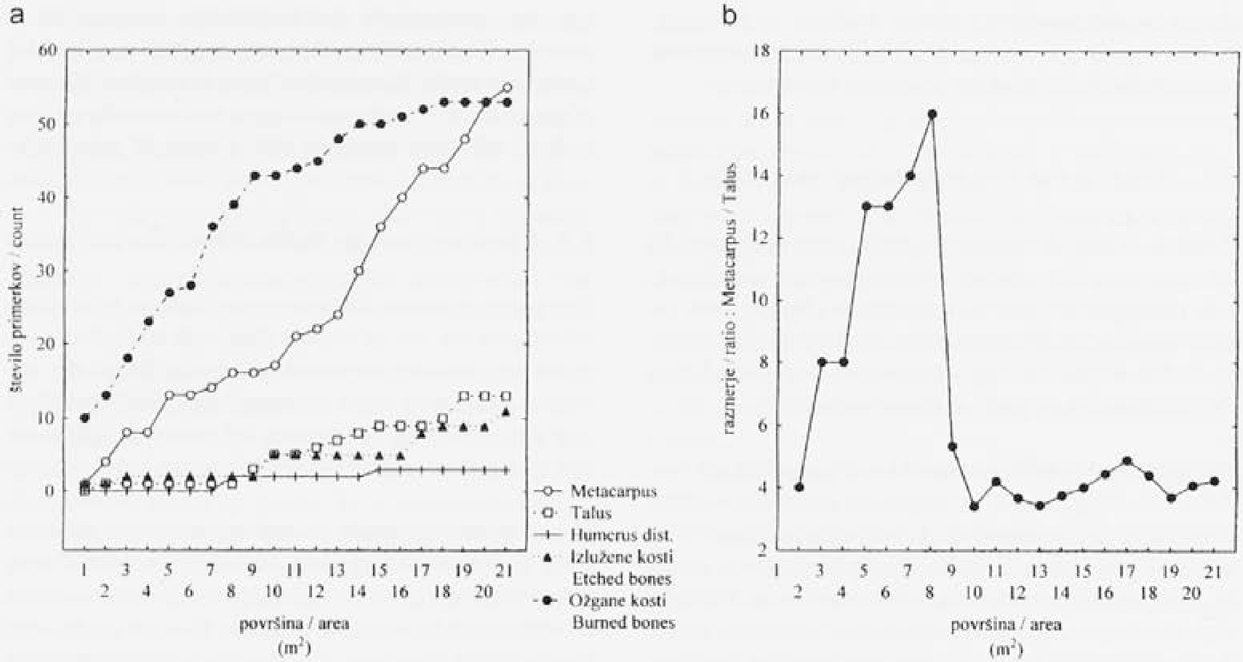
Primerjavo med mezolitskimi najdišči sem izvedel

The comparative method is standard in the archaeological treatment of material. I therefore compared the main complex of Mesolithic finds from Viktorjev spodmol with a similar group of finds at Slovene sites (Breg, Pod Črmukljo and M. Triglavca) and nearby and more distant Italian sites (Pečina na Leskovcu - *Grotta Azzurra*, Stenašca - *Grotta dell'Edera*, both on the Triestine Karst and Romagnano III in the Trento basin). In this, I relied on the geographic region (in this case the Mediterranean and sub-Mediterranean area), which represents a powerful linking factor, irrespective of time.

Comparison with sites north of the Alps did not seem to me to make much sense, since that is a completely different cultural environment, deriving from different foundations, with rare exceptions which could also be interpreted as influences from the Mediterranean, i.e., the Sauveterrian complex (Kozłowski 1980). Such, for example, is the so-called Sered' group in Slovakia, which J. Barta (1972, 1980) first linked with the Tardenoisian, and later with the Sauveterrian. Microlithic armatures of this group are actually very similar to microlithic armatures in Slovene and 'Italic' Mesolithic sites, especially Late Mesolithic, as well as armatures in the Mediterranean part of France, as far as the Atlantic between the Central Massif and the Pyrenees.

In all comparative sites, small areas have been excavated and processed (0.4 m²-8 m²). The differences between the investigated areas and, consequentially, between the volumes of sediments containing finds are sufficiently large that they could have an impact on the inter-site variability of individual groups of finds.

I studied the spatial variability of finds more carefully in the case of Divje babe I, where I have adequate data collected for such study. These relate to various finds of cave bear, but the question of spatial variability is similar as with archaeological remains. The distribution curves of individual finds obtained with the gradual increase in the studied volume of sediments and their area, have different shapes and mutually intersect (Fig. 8.1 a). All this causes the ratio between individual finds to change, depending on the volume and area of sediments investigated (Fig. 8.1 b).



Sl. 8.1: Prikaz odvisnosti izsledkov od obsega raziskanih sedimentov na podlagi izbranih podatkov iz najdišča Divje babe I. a) Absolutne vrednosti. b) Razmerji dveh absolutnih vrednosti. Vse iz 12 cm debelega sedimentacijskega nivoja plasti 7, ki je vsebovala največ fosilnih ostankov.

Fig. 8.1: Presentation of the dependence of results on the extent of sediments studied on the basis of selected data from the Divje babe I site. a) Absolute values. b) Ratio of two absolute values. All from a 12 cm thick sedimentation level of layer 7, which contained the most fossil remains.

med najdbami iz celotne ali delne prostornine sedimentov iz vseh mezolitskih nivojev (blok sedimentov v najdišču, sestavljen iz režnjev in/ali plasti) in med najdbami iz najbogatejšega mezolitskega nivoja (režnja, ki obsega celotno raziskano površino) najdišča. Za takšno primerjavo sem se odločil iz naslednjih razlogov:

Pri najdbah v bloku vpliva na njihovo variabilnost bogastvo/revščina posameznih mezolitskih nivojev, pri čemer v praksi zelo težko razlikujemo med naravnimi in umetnimi sedimentacijskimi nivoji *sensu strictu* (glej Turk 2003). Število in sestav najdb (količina in kakovost) sta odvisna predvsem od trajanja in jakosti poselitve v času formiranja mezolitskega sedimentacijskega nivoja (ki ga enačim z režnjem) ter od dejavnosti, ki so jih ljudje izvajali na najdišču. Šele nato nastopi za arheologijo tako zanimiv in pomemben razvoj oziroma sprememba tradicije, ki lahko poteka izohrono ali diahrono v prostoru. Za ugotavljanje vseh vzrokov, ki privedejo do variabilnosti predmetov arheološkega proučevanja, pa je ključnega pomena časovna ločljivost dogodkov, ki je premo sorazmerna s hitrostjo sedimentacije. Časovna ločljivost je v stratigrafsko nedeljivem bloku sedimentov običajno majhna, v stratigrafsko deljivem pa velika.

Pri sedimentacijskem nivoju (režnju) z najbogatejšimi najdbami je vpliv tistih dejavnikov, ki niso povezani z razvojem in tradicijo, na variabilnost najdb minimalen, saj takšen reženj predstavlja bodisi zelo dolgo bodi-

I made the comparisons between Mesolithic sites between finds from the entire or partial volume of sediments from all Mesolithic levels (block of sediments in a site composed of spits and/or layers) and between finds from the richest Mesolithic level (spit covering the entire investigated area) of the sites. I decided on such a comparison for the following reasons:

With finds in a block, the richness/poverty of individual Mesolithic levels influences their variability, whereby in practice it is very difficult to distinguish between natural and artificial sedimentation levels *sensu strictu* (see Turk 2003). The number and composition of finds (quantity and quality) depend mainly on the duration and intensity of settlement at the time of formation of the Mesolithic sedimentation level (which is equated with spit) and on activities that people carried out at the site. Only then does development or change of tradition that can occur isochronously or diachronously in the rate, appear that is interesting and important for archaeology. For establishing all the causes that lead to variability of objects of archaeological study, the temporal division of events, which corresponds to the rate of sedimentation, is of crucial importance. The temporal resolution in a stratigraphically undivided block of sediments is normally small, but large in stratigraphically divided ones.

With the sedimentation level (spit) with the richest finds, the influence of the factors that are not connecsi zelo močno poselitev v okviru najdišča ali določenega dela najdišča. Časovna ločljivost je pri posameznem režnju nedvomno večja kot pri bloku sedimentov.

8.1 Primerjava s slovenskimi najdišči

Primerjavo med domačimi najdišči (razpredelnica 8.1) otežuje uporaba različnih terensko-laboratorijskih metod: nepresejanje usedlin z najdbami (Breg), suho sejanje na situ s premerom odprtin 5 mm (Pod Črmukljo) in mokro sejanje na situ s premerom odprtin 0,5 mm (M. Triglavca) in 1 mm (Viktorjev spodmol).

Razmerje med izdelki in odpadki je od najdišča do najdišča zelo različno, kar je nedvomno povezano s terensko-laboratorijsko metodo in z natančnostjo, s katero se je ta izvajala. O tem ni smiselno izgubljati besed, ker je to jasno razvidno na podlagi obeh vzorcev iz Viktorjevega spodmola (glej Turk, ta zbornik). Viktorjeva sonda je bila pregledana bistveno manj natančno kot izkop po režnjih.

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ted with development and tradition is minimal, since such a spit represents either very long or very intense settlement in the framework of the site or a specific part of the site. Temporal resolution is undoubtedly greater with an individual spit than with a block of sediments.

8.1 Comparison with Slovene Sites

Comparison among Slovene sites (Table 8.1) is made difficult by the use of various fieldwork and laboratory methods: unsieved sediments with finds (Breg), dry sieving on sieves with 5 mm diameter holes (Pod Črmukljo) and wet sieving on sieves with 0.5 mm (M. Triglavca) and 1 mm (Viktorjev spodmol) diameter holes.

The ratio between products and debris is very different from site to site, which is undoubtedly connected with fieldwork and laboratory methods and with the accuracy with which these are carried out. It is not worth wasting words on this, since it is clearly evident on the basis of the two samples from Viktorjev spodmol (see Turk,

Razpredelnica 8.1: Kvantitativno-kvalitativna primerjava med slovenskimi mezolitskimi najdišči in Viktorjevim spodmolom (V. s.).
Table 8.1: Quantitative and qualitative comparison between Slovene Mesolithic sites and Viktorjev spodmol (V. s.)

Najdišče, blok, reženj Site, block, spit	Opredelitev Phase	Odpadki Debris	Izdelki Tools	Jedra Cores	Praskala Endscrapers	Sovt. konice Sauvt. points	Vir Source
Breg (8 m^3)	Kastelnovjen Castelnovian	2525	148	12	61	0 (1)	Frelih 1986 (Turk)
Pod Črmukljo (2 m^3)	Kastelnovjen Castelnovian	2750	298	25	8	0	Brodar 1992 (Turk)
M. Triglavca (1,5 m^3)	Kastelnovjen Castelnovian	21 809	274	65	35	17	Turk
V.s. sonda (2 m^3) V.s. test trench (2 m^3)	Kastelnovjen? Castelnovian?	2550	107	30	11	12	Turk
V.s. režnji 1–19 (0,3 m^3) V.s. spits 1–19 (0,3 m^3)	Kastelnovjen? Castelnovian?	10 158	89	14	2	5	

Nadaljevanje continuation

Najdišče, blok, reženj Site, block, spit	Opredelitev Phase	Trikotniki Triangles	Segmenti Segments	Trapezi Trapezes	Mikro vbadala Microburins	Vir Source
Breg (8 m^3)	Kastelnovjen Castelnovian	0	4 (2)	**12**	0	Frelih 1986 (Turk)
Pod Črmukljo (2 m^3)	Kastelnovjen Castelnovian	10	0	**8 (13)**	? (16)	Brodar 1992 (Turk)
M. Triglavca (1,5 m^3)	Kastelnovjen Castelnovian	45	2?	**38**	68	Turk
V.s. sonda (2 m^3) V.s. test trench (2 m^3)	Kastelnovjen? Castelnovian?	22	0	**1**	9	Turk
V.s. režnji 1–19 (0,3 m^3) V.s. spits 1–19 (0,3 m^3)	Kastelnovjen? Castelnovian?	15	0	**3**	5	

OPOMBE:
Trikotniki združujejo dva tipa orodij: klinice s hrbtom in prečno retušo ter trikotnike.
Pri sovterskih konicah so skoraj izključno takšne, ki imajo dvojen hrbet, pomaknjen daleč proti sredini klinice.
Pri trikotnikih prevladujejo raznostranični nad enakokrakimi v razmerju 22:1 v M. Triglavci in 36:1 v Viktorjevem spodmolu.
NOTES:
Category triangles includes truncated backed bladlets and triangles.
Category sauveterrian points includes almost exclusively double backed points with deep abrupt retouch.
Triangles are mostly scalene and scalene–isocele ratio is 22:1 in M.Triglavca and 36:1 in Viktorjev spodmol.

Vendar se vpliv metode na variabilnost arheoloških sestavov običajno ne upošteva. Lep primer takšnega ravnanja je 'konstruiranje' mezolitskih skupin na Balkanu in odnosov z drugimi mezolitskimi skupinami (Kozłowski, Kozłowski 1983). Navedel bi lahko še vrsto podobnih primerov, saj je to splošna arheološka praksa.

Pri večjih izdelkih (praskala, trapezi) in odpadkih (jedra, mikro vbadala) razlike med najdišči niso toliko povezane z metodami terenskega dela kot s preteklo tradicijo in posameznimi preteklimi tradicionalnimi dejavnostmi.

Praskala, jedra in mikro vbadala so povezana z različnimi dejavnostmi in njihovo intenzivnostjo.

Trapezi (predvsem izdelani z mikrovbadalno tehniko) so zelo verjetno del kastelnovjenske tradicije, saj jih sovterjen skoraj ne pozna. To je stratigrafsko in/ali kronometrično potrjeno na več najdiščih v Italiji in drugje. Trapezi so tako edini zanesljivi razpoznavni znak kastelnovjena (glej Broglio 1984, 311; Spataro 2002, 21). Pojavili naj bi se na prelomu 9. in 8. tisočletja pred sedanjostjo (BP) na območju od severne Afrike do srednje Evrope (Löhr 1994, 20), v severni Italiji pa med 7800 in 7500 BP (Broglio 1984, 287) oziroma okoli 8000 BP (Kozłowski, Dalmeri 2000, 13).

Seveda lahko podvomim o metodologiji, na podlagi katere so bili narejeni takšni sklepi. Pri tem mislim na povezovanje tipologije in kronometrije, ki je sicer nujno, vendar ne bi smelo biti krožno, temveč speljano na drugačen, bolj objektiven način, tj. temeljiti bi moralo na konvergenci rezultatov analiz več različnih, med seboj nepovezanih podatkov (glej Turk 2003). Drugače povedano, analizirani podatki se ne smejo podvajati, da tudi tako ne pride do krožnega argumentiranja. Pomembno je tudi, da se primerja izsledke več kot dveh povsem različnih metod.

Zanimivo je razmerje med trapezi (izdelki) in mikro vbadali (odpadki), ki so nastali pri izdelavi trapezov. Običajno je odpadkov precej več kot izdelkov. Zato me preseneča, da na Bregu poleg trapezov ni bilo najdeno nobeno mikro vbadalo. To si lahko razlagam s tem, da najdeni trapezi niso bili izdelani na mestu najdbe, ampak drugje, ali da trapezi niso bili narejeni s pomočjo mikrovbadalne tehnike. Slednje je bolj verjetno kot prvo, saj noben trapez nima trorobega trna, značilnega za mikrovbadalno tehniko. Izjema je en sam fragment trapeza iz plasti 1-2 in morda še en trapez iz teh plasti, ki ima retuširan domnevni trorobi trn (Frelih 1986, t. 1. 4; 2: 9).

Kastelnovjenska tradicija trapezov je najmočnejša v M. Triglavci (glej Turk *et al.*, ta zbornik) in najšibkejša v Viktorjevem spodmolu.

Razlike v mikrolitskih orodjih (dvojne konice z dvema hrbtoma, trikotniki, segmenti) med najdišči so povezane predvsem z različnimi terensko-laboratorijskimi metodami in z natančnostjo izvajanja teh metod, v primerih ko gre za isto metodo. Zato se jih ne upam povezati z določeno preteklo tradicijo. Edino gotovo pa je,

this volume). Viktor's test trench was examined essentially less carefully than the excavation by spits.

However, the influence of the method on the variability of the archaeological components is not normally taken into account. A good example of such behaviour is "constructing" Mesolithic groups in the Balkans and their relations with other Mesolithic groups (Kozłowski, Kozłowski 1983). A series of similar examples could be cited, since this is general archaeological practice.

With larger products (endscrapers, trapezes) and debris (cores, microburins), differences between sites are not so much connected with methods of fieldwork as with past tradition and individual past traditional activities.

Endscrapers, cores and microburins are connected with various activities and their intensities.

Trapezes (mainly made with microburin technique) are very probably part of the Castelnovian tradition, since they are almost unknown in the Sauveterrian. This is stratigraphically or chronometrically confirmed in a number of sites in Italy and elsewhere. Trapezes are thus the only reliable mark of recognition of the Castelnovian (see Broglio 1984, 311; Spataro 2002, 21). They are thought to have appeared at the turn of the 9th and 8th millennium BP over an area from northern Africa to Central Europe (Löhr 1994, 20), and in northern Italy between 7800 in 7500 BP (Broglio 1984, 287) or around 8000 BP (Kozłowski, Dalmeri 2000, 13).

We can, of course, suspect the methodology by which such conclusions were reached. I am thinking here of connecting the typology and chronometry, which is necessary but should not be rounded but drawn in a different, more objective manner, i.e., it should be based on convergences of results of analysis of a number of different, mutually unconnected data (see Turk 2003). Put another way, analysed data should not be redundant, so that it does not thus achieve a circular argument. It is also important that the results of more than two completely different methods are compared.

The ratio between trapezes (products) and microburins (debris) that were created in the manufacture of trapezes is also interesting. There is normally considerably more debris than products. It therefore surprises me that in Breg, in addition to trapezes, no micro burins were found. This could be explained by the fact that the trapezes were not made at the place of the finds, but elsewhere, or that the trapezes were not made with the aid of a microburin technique. The latter is more probable than the former, since none of the trapezes have a *piquant-trièdre*, typical of the microburin technique. The only exception is a fragment of trapeze from layers 1-2 and perhaps a trapeze from these layers which has a retouched *piquant-trièdre* (Frelih 1986, Plate 1. 4; 2: 9).

The Castelnovian tradition of trapezes is strongest in M. Triglavca (see Turk et al., this volume) and weakest in Viktorjev spodmol.

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da so segmenti z večine domačih mezolitskih najdišč redki. V tem pogledu je nerazumljivo odstopanje Brega od drugih najdišč. Nasploh je Breg problematično najdišče, ki kliče po novih raziskavah. To je edino radiometrično opredeljeno mezolitsko najdišče v Sloveniji. Njegova ^{14}C starost (6830 ±150 BP (Pohar 1984, 19; Frelih 1986, 31) oz. 6490 ±150 BP (Frelih 1985) se ne ujema s paleobotanično oceno starosti (Pohar 1984, Frelih 1986) in z arheološkim inventarjem.

Radiometrično določanje starosti zasluži nekaj kritičnih pripomb (glej tudi Turk, ta zbornik).

V tuji literaturi se za Breg stalno navaja napačno preračunana ^{14}C letnica iz koledarske letnice BC (po novejšem dogovoru BCE namesto BC), kot jo je objavil Frelih (1986, 31, 35) v ^{14}C letnico BP kot jo podajajo V. Pohar (1984) brez vsake oznake BP ali BC, D. Josipovič (1992) in sedaj Turk, oba z oznako BP. Ta napačna letnica je 6630 ±150 BP (Müller 1994, 351; Mlekuž 2001; Spataro 2002, 20).

Če je najdišče resnično tako mlado, ima dosti premalo trapezov. M. Triglavca, kjer se nedvomno stikajo mezolitske in neolitske plasti, ima npr. bistveno več trapezov in tudi mikro vbadal, v kolikor ne gre za umetno ustvarjeno mešanico mezolitske in neolitske tradicije. Enako velja za italijanska najdišča iz približno istega kronološkega odseka.

Nadaljnja še neobjavljena izkopavanja na novi lokaciji na Bregu, ki jih je vodil M. Budja, so dala za spodnji del mezolitskega horizonta, ki se nahaja 0,5 m pod glavnino kastelnovjenskih najdb in keramike, ^{14}C sta-rost 9180 ±50 BP (Mlekuž 2001, 47, sl. 4). Nova datacija in nov profil sta pokazale na težave, ki jih povzročata ^{14}C kronometrija in koreliranje najdb v prostoru. Sam menim, da je prva ^{14}C letnica Brega (6830 BP) bistveno pomlajena in kot takšna nepravilna. Na podlagi te letnice je lahko Breg uvrščen v čas prehoda iz mezolitika v neolitik, čas t. i. neolitizacije na območju celotne Jadranske obale, s Tržaškim krasom vred (glej Improta, Pessina 1998–1999). Vendar so odnosi med poznim mezolitikom in zgodnjim neolitikom v za nas zanimivem območju severovzhodne Italije precej nejasni (prav tam), za kar je po mojem treba iskati vzrok predvsem v nezanesljivosti radiometričnih datumov in v popolnoma nekritičnem enačenju arheologije in kronometrije (arheoloških in kronometričnih podatkov). Večini arheologom, pa tudi drugim se zdi, da je kronometrija trenutno edina zanesljiva in vsemogočna kronološka metoda, kar pa še zdaleč ni res.

8.2 Primerjava z italijanskimi najdišči

Primerjava Viktorjevega spodmola z bližnjimi najdišči Tržaškega krasa in z bolj oddaljenim referenčnim najdiščem Romagnano III (razpredelnica 8.2 in 8.3) je lažja zaradi podobnih terenskih metod (mokro sejanje na si-

Differences in microlithic tools (double-backed bipoints, triangles, segments) between sites are mainly connected with different fieldwork and laboratory methods, and the accuracy with which these methods were implemented in cases when the same method was used. I do not therefore hope to connect them with a specific past tradition. The only certainty is that segments from the majority of local Mesolithic sites are rare. From this point of view, the deviation of Breg from other sites is incomprehensible. Breg is in general a problematic site which calls for new research. This is the only radiometrically defined Mesolithic site in Slovenia. Its ^{14}C age (6830 ±150 BP (Pohar 1984, 19; Frelih 1986, 31) or. 6490 ±150 BP (Frelih 1985) does not conform to the palaeobotanical assessment of age (Pohar 1984, Frelih 1986) and the archaeological inventory.

Radiometrically determined age deserves some critical comments (see also Turk, this volume).

In the foreign literature, a wrongly calculated ^{14}C date from the calendar date BC (by new agreement BCE instead of BC) is constantly cited for Breg, as published by Frelih (1986, 31, 35) in ^{14}C date BP as given by V. Pohar (1984) without any kind of sign BP or BC, D. Josipovič (1992) and now Turk, both with the sign BP. This wrong date is 6630 ±150 BP (Müller 1994, 351; Mlekuž 2001; Spataro 2002, 20).

If the site is really that recent, it has considerably too few trapezes. M. Triglavca, where there is undoubtedly contact between Mesolithic and Neolithic layers, has for example, more trapezes and also microburins, insofar as it is not an artificially created mixed Mesolithic and Neolithic tradition. The same applies to Italian sites from approximately the same chronological section.

Furthermore, as yet unpublished excavations at a new location in Breg, lead by M. Budja, gave for the lower part a ^{14}C age of 9180 ±50 BP (Mlekuž 2001, 47, Fig. 4). The new dating and new profile have shown the difficulties which ^{14}C chronometry and correlating finds in the space cause. I myself believe that the first ^{14}C date of Breg (6830 BP) is essentially too recent and as such incorrect. On the basis of this dating, Breg can be placed at the transition from the Mesolithic to the Neolithic, a time of neolithisation in the area of the entire Adriatic coast, including the Triestine Karst (see Improta, Pessina 1998–1999). However, the relations between the late Mesolithic and the early Neolithic in the for us interesting area of northeast Italy are fairly unclear (*ibid*), for which in my opinion it is necessary to seek the reasons mainly in unreliable radiometric dating and a completely uncritical equating of archaeology and chronometry (archaeological and chronometrical data). To the majority of archaeologists, and it appears to others, too, chronometry is currently the only reliable and omnipotent chronological method, which is far from being true.

tih s premerom luknjic 1 mm). Otežujejo jo edino razlike v površinah in prostorninah raziskanih sedimentov.

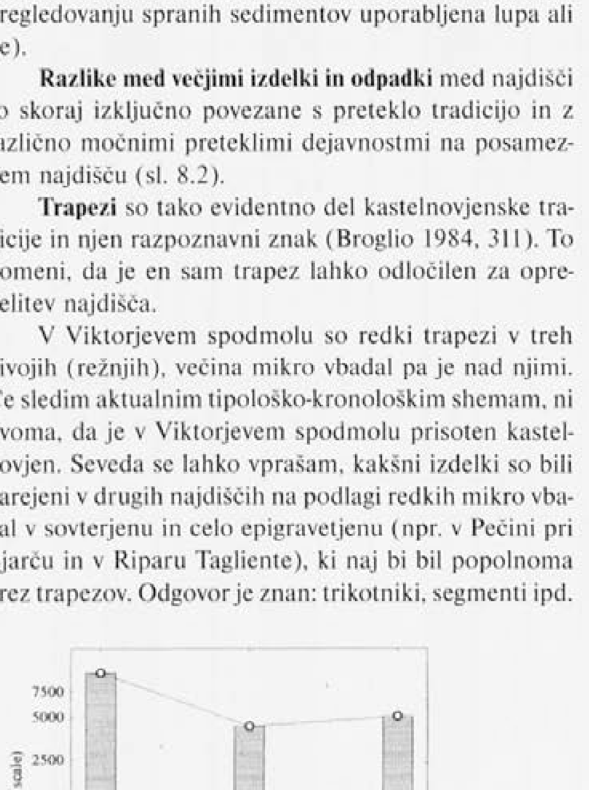
Kako raziskana površina in volumen sedimentov vplivata na razmerja med posameznimi sklopi najdb je razvidno na primeru Pečine na Leskovcu - *G. Azzurra* (razpredelnica 8.2). Analiza podatkov iz tega najdišča je lahko problematična zaradi velikega vpada plasti, ki je na površini 1 m^2 sicer nepomemben, pridobi pa veljavo na večji površini (glej Cremonesi *et al.* 1984, sl. 2). Žal ni jasno, ali je A. Ciccone (1992) v svoji analizi celotnega mezolitskega gradiva po (menda vodoravnih) režnjih upoštevala vpad plasti in če ga je, kako je to storila (za rešitev podobnega vprašanja glej Turk 2003).

Razlike v razmerju med odpadki in izdelki med najdišči so predvsem posledica natančnosti pri izvajanju terensko-laboratorijske metode (npr. tega, ali je bila pri pregledovanju spranih sedimentov uporabljena lupa ali ne).

Razlike med večjimi izdelki in odpadki med najdišči so skoraj izključno povezane s preteklo tradicijo in z različno močnimi preteklimi dejavnostmi na posameznem najdišču (sl. 8.2).

Trapezi so tako evidentno del kastelnovjenske tradicije in njen razpoznavni znak (Broglio 1984, 311). To pomeni, da je en sam trapez lahko odločilen za opredelitev najdišča.

V Viktorjevem spodmolu so redki trapezi v treh nivojih (režnjih), večina mikro vbadal pa je nad njimi. Če sledim aktualnim tipološko-kronološkim shemam, ni dvoma, da je v Viktorjevem spodmolu prisoten kastelnovjen. Seveda se lahko vprašam, kakšni izdelki so bili narejeni v drugih najdiščih na podlagi redkih mikro vbadal v sovterjenu in celo epigravetjenu (npr. v Pečini pri Bjarču in v Riparu Tagliente), ki naj bi bil popolnoma brez trapezov. Odgovor je znan: trikotniki, segmenti ipd.



Sl. 8.2: Razmerje med odpadki, jedri in izdelki v različnih mezolitskih najdiščih.

Fig. 8.2: Ratio between debris, cores and tools in various Mesolithic sites.

8.2 Comparison with Italian Sites

A comparison of Viktorjev spodmol with nearby sites on the Triestine Karst and with the more distant reference site Romagnano III (Table 8.2 and 8.3) is easier because of similar fieldwork methods (wet sieving on sieves with diameter of hole of 1 mm). It is only made difficult by differences in the areas and volumes of the sediments examined.

How the examined area and volume of sediments affect the ratio between individual groups of finds is clear in the case of Pečina na Leskovcu - *G. Azzurra* (Table 8.2). Analysis of the data from this site can be problematic because of the large inclination of layers, which is unimportant on an area of 1 m^2, but gains validity on a larger area (see Cremonesi et al. 1984, Fig. 2). Unfortunately, it is not clear whether A. Ciccone (1992), in her analysis of the entire Mesolithic material by (probably horizontal) spits took into account the dip of layers and if she did, how it was done (for the solution of a similar question see Turk 2003).

Differences in the ratios between debris and products between sites are mainly the result of accuracy in the implementation of fieldwork and laboratory methods (e.g., whether a magnifying glass was used or not in examining washed sediments).

Differences between larger products and debris between sites are almost exclusively connected with past tradition and with different strong past activities at an individual site (Fig. 8.2).

Trapezes are thus evidently part of the Castelnovian tradition and diagnostic of it (Broglio 1984, 311). This means that a single trapeze can be decisive in classifying the site.

In Viktorjev spodmol, trapezes on three levels (spits) are rare, and the majority of microburins are above them. If I trace the actual typological and chronological scheme, there is no doubt that Castelnovian is present in Viktorjev spodmol. I can of course ask what kind of products were made at other sites, on the basis of occasional microburins in the Sauveterrian and even Epigravettian (e.g., in Pečina pri Bjarču or in Riparo Tagliente), which are supposed to be completely without trapezes. The answer is known: triangles, segments etc. However, it is known that the number of microburins increases mainly proportionately to the number of trapezes and falls in inverse proportion to the number of triangles. The question of the microburin technique is especially pressing if microburins from various periods do not differ among themselves.

The possibility that in distinguishing Sauveterrian from Castelnovian we are turning in the circle of chronometry and archaeological typology in my view cannot be excluded, so I will discuss this further. In order to break the circle, we would have to replace the simplified method of connecting archaeological typology with

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Razpredelnica 8.2: Kvantitativno-kvalitativna primerjava med Pečino na Leskovcu - *Grotta Azzurra* (G. A.) in Viktorjevim spodmolom (V. s.).
Table 8.2: Quantitative and qualitative comparison between Pečina na Leskovcu - *Grotta Azzurra* (G. A.) and Viktorjev spodmol (V. s.).

B	Najdišče, blok, režnji Site, block, spit	Opredelitev Phase	Odpadki Debris	Izdelki Tools	Jedra Cores	Praskala Endscrapers	Sovt. konice Sauv. points	Trikotniki Triangles	Segmenti Segments	Trapezi Trapezes	Mikro-vbadala Micro burins	Vir Source
B	G. A. režnji 1–4 (0,2 m^3) G. A. spits 1–4 (0,2 m^3)	Kastelnovjen? Castelnovian?	4284	160	50	16	3	35	1?	**5**	22	Cremonesi *et al.*1984
l	V. s. režnji 1–19 (0,3 m^3) V. s. spits 1–19 (0,3 m^3)	Kastelnovjen? Castelnovian?	10158	89	14	2	5	15	0	**3**	5	Turk
l	V. s. sonda (2 m^3) V. s. test trench (2 m^3)	Kastelnovjen? Castelnovian?	2550	107	30	11	12	22	0	**1**	9	
o	G. A. režnji 1–4. (0,7 m^3) G. A. spits 1–4. (0,7 m^3)	Kastelnovjen? Castelnovian?	?	1197	?	53	60	169	9	**10**	pogosta frequent	Ciccone 1992
o	G. A. režnji 5–17 (0,8 m^3) G. A. spits 5–17 (0,8 m^3)	Sovterjen Sauveterrian	7417	263	119	22	9	49	3	**0**	3	Cremonesi *et al.*1984
c	G. A. režnji 5–17 (2,1 m^3) G. A. spits 5–17 (2,1 m^3)	Sovterjen Sauveterrian	?	935	?	64	48	156	8	**0**	redka rare	Ciccone 1992
k	G. A. režnji 1–17 (1,0 m^3) G. A. spits 1–17 (1,0 m^3)		11701	423	169	38	12	84	3 (4?)	**5**	25	Cremonesi *et al.*1984
k	G. A. režnji 1–17 (2,8 m^3) G. A. spits 1–17 (2,8 m^3)		41601	2132	380	117	108	325	17	**10**	135	Ciccone 1992

	G. A. režen 4 (1 m^2) G. A. spit 4 (1 m^2)	Kastelnovjen? Castelnovian?	1755	51	22	4	2	13	0	**2**	2	Cremonesi *et al.*1984
S	G. A. režen 4 (3,5 m^2) G. A. spit 4 (3,5 m^2)	Kastelnovjen? Castelnovian?	?	?	?	12	26	80	1	**1**	?	Ciccone 1992
R	V. s. režen 16 (0,4 m^2) V. s. spit 16 (0,4 m^2)	Kastelnovjen? Castelnovian?	746	13	1	0	2	2	0	**1**	0	Turk
e p	G. A. režen 7 (1 m^2) G. A. spit 7 (1 m^2)	Sovterjen Sauveterrian	1056	38	17	2	1	15	0	**0**	1	Cremonesi *et al.*1984
ž	G. A. režen 7 (3,5 m^2) G.A. spit 7 (3,5 m^2)	Sovterjen Sauveterrian	?	?	?	5	8	41	0	**0**	?	Ciccone 1992
e i	V. s. režen 16 (0,4 m^2) V. s. spit 16 (0,4 m^2)	Kastelnovjen? Castelnovian?	746	13	1	0	2	2	0	**1**	0	Turk
n	G. A. režen 9 (1 m^2) G. A. spit 9 (1 m^2)	Sovterjen Sauveterrian	947	45	23	3	2	3	0	**0**	1	Cremonesi *et al.*1984
j t	G. A. režen 9 (3,5 m^2) G. A. spit 9 (3,5 m^2)	Sovterjen Sauveterrian	?	?	?	8	8	25	0	**0**	?	Ciccone 1992
	V. s. režen 16 (0,4 m^2) V. s. spit 16 (0,4 m^2)	Kastelnovjen? Castelnovian?	746	13	1	0	2	2	0	**1**	0	Turk

OPOMBE:

Režnji v obeh najdiščih so enako debeli (5 cm).

Med sovterskimi konicami so skoraj izključno takšne, ki imajo dvojen hrbet, pomaknjen daleč proti sredini klinice. Trikotniki združujejo dva tipa orodij: klinice s hrbtom in prečno retušo (*dorsi e troncature*) in trikotnike (*geometrici: triangoli*). Na spremembe v pogostnosti trikotnikov in sovterskih konic vpliva njihova velika fragmentarnost, ki otežuje klasifikacijo teh izdelkov. Med trikotniki prevladujejo raznostranični nad enakokrakimi v razmerju 19:1 v *G. Azzurra* in 36:1 v Viktorjevem spodmolu.

NOTES:

Spits in both sites have the same depth (5 cm). Category Sauveterrian points includes almost exclusively double backed points with deep abrupt retouch. Category triangles includes truncated backed bladelets (*dorsi e troncature*) and triangles (*geometrici: triangoli*). Variability in frequency of triangles and Sauveterrian points depends on fragmention which makes difficult their classification. Triangles are mostly scalene and scalene-isocele ratio is 19:1 in *G. Azzurra* and 36:1 in Viktorjev spodmol.

Razpredelnica 8.3: Kvantitativno-kvalitativna primerjava med najdišči Romagnano III (R. III), Riparo Gaban, Stenašco - *Grotta dell'Edera* (G. E.) in Viktorjevim spodmolom (V. s.).

Table 8.3: Quantitative and qualitative comparison between Romagnano III (R. III), Riparo Gaban, Stenašca - *Grotta dell'Edera* (G. E.) and Viktorjev spodmol (V. s.).

Najdišče, blok, plast, reženj Site, block, layer, spit	**Opredelitev** Phase	**Odpadki** Debris	**Izdelki** Tools	**Jedra** Cores	**Praskala** Endscrapers	**Sovt. konice** Sauv. points	**Trikotniki** Triangles	**Segmenti** Segments	**Trapezi** Trapezes	**Mikro vbadala** Micro burins	**Vir** Source
R. III plasti AC3-AC 9 (?5 m²) R. III layers AC3-AC 9 (?5 m²)	Srednji sovterjen Middle Sauveterrian	?	1777	191	214	139	299	158	**0**	15	Broglio, Kozlowski 1983
R. Gaban plast FA (0,7 m²) R. Gaban layer FA (0,7 m²)	Starejši kastelnovjen Early Castelnovian	5063	210	26 (41)	18	2 (4)	43	4	**14**	763	Kozlowski, Dalmeri 2000
R. Gaban plast E (1,3 m²) R. Gaban layer E (1,3 m²)	Mlajši kastelnovjen Late Castelnovian	5150	466	6 (33)	25	2	1	0	**41**		
V. s. sonda (2 m²) V. s. test trench (2 m²)	Kastelnovjen? Castelnovian?	2550	107	30	11	12	22	0	**1**	9	Turk
V. s. režnji 1–19 (0,3 m²) V. s. spits 1–19 (0,3 m²)	Kastelnovjen? Castelnovian?	10 158	89	14	2	5	15	0	**3**	5	
G. E. režnji 6–12 (2,7 m²) G. E. spits 6–12 (2,7 m²)	Sovterjen Sauveterrian	8681	589	32	27	15	115	3	**0**	8	Boschian, Pitti 1984
G. E. reženj 9 (3 m²) G. E. spit 9 (3 m²)	Sovterjen Sauveterrian	2064	131	8	10	0	40	0	**0**	2	
R. III plast AC7 (6 m²) R III layer AC7 (6 m²)	Srednji sovterjen Middle Sauveterrian	?	377	38	40	35	55	43	**0**	2	Broglio, Kozlowski 1983
V. s. reženj 16 (0,4 m²) V. s. spit 16 (0,4 m²)	Kastelnovjen? Castelnovian?	746	13	1	0	2	2	0	**1**	0	Turk

OPOMBE:
Režnji v Romagnano III so bili domnevno debeli 5-10 cm (glej Kozlowski, Dalmeri 2000, 6; Biagi, Spataro 1999-2000, 48), v G. dell'Edera pa 10 cm (Boschian, Pitti 1984). Podatki za Romagnano III so povzeti iz naslednjih tabel (Broglio, Kozlowski 1983): izdelki (tab.4), jedra (tab. 2), praskala (tab. 6), sovt. konice (tab. 28, tipi 1-4 in tip 6 proporcionalno tipom 1-4), trikotniki, segmenti, trapezi (tab. 8) in mikro vbadala (tab. 13, tipa 19 in 20). Trikotniki združujejo dva tipa orodij: klinice s hrbtom in prečno retušo (*dorsi e troncature*) in trikotnike (*geometrici: triangoli*). Na spremembe v pogostnosti trikotnikov in sovterskih konic vpliva njihova velika fragmentarnost, ki otežuje klasifikacijo teh izdelkov.Med trikotniki prevladujejo raznostranični nad enakokrakimi v razmerju 2-3:1 v Romagnanu III, 114:1 v G. dell'Edera, 44:0 v R. Gaban (vendar sta bila 2 enakokraka primerka najdena pri izkopavanjih B. Bagolinija 1971, 1979) in 36:1 v Viktorjevem spodmolu. Pri R. Gaban so upoštevane samo najdbe v sektorju IV, ki je bil izkopan v letih 1982-1983.

NOTES:
Spits in Romagnano III were maybe 5-10 cm thick (*cf.* Kozłowski, Dalmeri 2000, 6; Biagi, Spataro 1999-2000, 48) and 10 cm in G. dell'Edera (Boschian, Pitti 1984). Data for Romagnano III were extracted from Broglio, Kozłowski 1983: tools (table 4), cores (table 2), endscrapers (table 6), Sauveterrian points (tab. 28, types 1-4 and type 6 proportional to types 1-4), triangles, circle segments, trapezes (table 8) and microburins (table 13, types 19 and 20). Category triangles includes truncated backed bladelets (*dorsi e troncature*) and triangles (*geometrici: triangoli*). Variability in frequency of triangles and Sauveterrian points depends on fragmention which makes difficult their classification. Triangles are mostly scalene and scalene-isocele ratio is 2-3:1 in Romagnano III, 114:1 in G. dell'Edera, 44:0 in R. Gaban (though 2 isocelet riangles were recovered during the excavation of B. Bagolini 1971, 1979) and 36:1 in Viktorjev spodmol.With R. Gaban site are represented only finds from sector IV, which was excavated in 1982-1983.

Vendar je znano, da število mikro vbadal narašča predvsem premo sorazmerno s številom trapezov in upada obratno sorazmerno s številom trikotnikov. Vprašanje mikrovbadalne tehnike je zlasti pereče, če se mikro vbadala iz različnih obdobij med seboj ne razlikujejo.

chronometry with a more complete method of linking sites and data.

In view of the number of trapezes in the earlier and later Castelnovian levels of the site, R. Gaban (Table 8.3), I would classify Viktorjev spodmol in the ear-

Možnost, da se pri razlikovanju sovterjena od kastelnovjena vrtimo v krogu kronometrije in arheološke tipologije, po mojem ni izključena, zato bom o tem še razpravljal. Da bi krog presekali, bi morali poenostavljen način povezovanja arheološke tipologije s kronometrijo zamenjati z bolj dodelanim načinom za povezovanje najdišč in podatkov.

Glede na število trapezov v starejšem in mlajšem kastelnovjenskem nivoju najdišča R. Gaban (razpredelnica 8.3) bi Viktorjev spodmol lahko uvrstil v starejšo fazo kastelnovjena, M. Triglavco pa v njegovo mlajšo fazo pod pogojem, da trapezi v M. Triglavci ne pripadajo neolitski plasti oz. neolitiku. S takšno umestitvijo se ujema tudi število mikro vbadal, preračunano na število trapezov.

Mikroliti so del sovterjenske in kastelnovjenske tradicije in so ključni za ugotavljanje razvojnih trendov mezolitskih inventarjev. Na različna razmerja med posameznimi tipi mikrolitov med najdišči nedvomno vpliva že omenjena prostorska variabilnost. Zato tukaj ne pridemo daleč. Kakšna je vloga segmentov in enakokrakih trikotnikov, ki močno prevladujejo v sovterjenskih plasteh najdišča Romagnano III, bi težko sodil samo na podlagi enega ali dveh najdišč. Razumljivo bi bilo, če bi enakokraki trikotniki sčasoma prešli v raznostranične ali obratno, vendar temu ni tako (glej Barbaza *et al.* 1991, 224). Po drugi strani pa kaže, da proti koncu mezolitika povsem izginejo enakokraki trikotniki (Broglio, Kozłowski 1983, sl. 32; Barbaza *et al.* 1991, 241, sl. 2).

Vprašanje zase so hipermikroliti, ki se v Italiji pojavljajo predvsem v mlajšem mezolitiku (kastelnovjenu), tj. v atlantski dobi. V Franciji je hipermikrolitizacija segmentov (tudi asimetričnih, ki spominjajo na trikotnike) značilna že za starejši montadjen (*Montadien ancien*), tj. drijas (*dryas*) III (Rozoy 1978b, t. 68, 70) in se nadaljuje tudi v srednjem sovterjenu (*Sauveterrien moyen*), tj. v borealu (Barbaza et al 1991, 236, 240s, 251, slike).

Viktorjev spodmol se, kar zadeva mikrolite, v nekaterih pogledih razlikuje od italijanskih najdišč, če upoštevam prostornino raziskanih sedimentov. Kaže, da ima rahlo več dvojnih konic z dvema hrbtoma, medtem ko imajo italijanska najdišča več trikotnikov. Med njimi so tudi takšni, ki jih v Viktorjevem spodmolu ni (npr. tip *Montclus*).

Za ustrezno rešitev takšnih in podobnih vprašanj bi morali najprej rešiti **vprašanje odnosa med časom in prostorom.**

Če bi hoteli ugotoviti npr. zanesljiva razmerja med konicami in trikotniki v najdiščih in med njimi, bi morali povečati raziskano površino do mere, ko bi presegli prostorsko variabilnost najdb. Namreč: stvari variirajo v prostoru vse do tedaj, dokler ne zajamemo celotnega osrednjega področja njihove razprostranjenosti ali drugače povedano, dokler ne preidejo v ravnotežno stanje ('steady state'). Ko zajamemo tudi obrobno področje razprostranjenosti, se variabilnost umiri.

VIKTORJEV SPODMOL

lier phase of the Castelnovian, and M. Triglavca in its later phase, provided that the trapezes in M. Triglavca do not belong to the Neolithic layers, or the Neolithic. The number of microburins, calculated by the number of trapezes, conforms to such a classification.

Microliths are part of the Sauveterrian and Castelnovian tradition and are crucial for establishing development trends of the Mesolithic inventory. The already mentioned spatial variability undoubtedly influences the different ratios between individual types of microliths between sites. We will not therefore go further here. What the role is of segments and isosceles triangles, which greatly predominate in Sauveterrian layers of the Romagnano III site, would be difficult to judge on the basis of one or two sites, only. It would be understandable if isosceles triangles gradually transformed into scalene triangles or the reverse, but it is not so (see Barbaza et al. 1991, 224). On the other hand, it appears that towards the end of the Mesolithic, isosceles triangles completely disappear (Broglio, Kozłowski 1983, Fig. 32; Barbaza et al. 1991, 241, Fig. 2).

Hypermicroliths are a question in themselves, which appear in Italy mainly in the later Mesolithic (Castelnovian), i.e., in the Atlantic period. In France, hypermicrolithisation of segments (including asymmetric ones reminiscent of triangles) is already characteristic of the Early Montadien (*Montadien ancien*), i.e., Dryas III period (Rozoy 1978b, Plate 68, 70) and also continues into the middle Sauveterrian (*Sauveterrien moyen*), i.e., into the Borreal period (Barbaza et al 1991, 236, 240s, 251, figures).

Viktorjev spodmol, as far as microliths are concerned, differs in some points of view from Italian sites, if I take into account the volume of examined sediments. It appears that it has slightly more double-backed bipoints, while Italian sites have more triangles. They include those that are absent from Viktorjev spodmol (e.g. type *Montclus*).

For a suitable solution of this and similar questions we would first have to solve the question of the **relation between time and space**.

If, for instance, we wanted to establish a reliable ratio between points and triangles within sites and between them, we would have to increase the investigated area to the extent that it exceeded the spatial variability of finds. Namely: things vary in space right up until they embrace the entire central area of their distribution, or put another way, until a 'steady state' is achieved. When we also embrace the marginal areas of their distribution, the variability reduces.

All processes and things connected with man, namely, have a specific distribution in space (and time) and are concentrated somewhere; they have a centre or a number of centres.

So burned bone fragments are created in a hearth or hearths and are spread from there into space. When

Vsi procesi in stvari, ki so povezani s človekom, imajo namreč določeno razprostranjenost v prostoru (in času) in se nekje zgostijo; imajo svoj center ali več centrov.

Tako so ožgani kostni drobci nastali v kurišču ali kuriščih in se od tam razširili v prostor. Ko prostor povečujem, število ožganih kostnih drobcev eksponencialno (ali linearno ali kako drugače) narašča, vse dokler ne zajamem vsega osrednjega dela njihove razprostranjenosti. S prehodom na periferni del razprostranjenosti se krivulja izravna in doseženo je ravnotežno stanje (sl. 8.1). Od tod naprej je vzorec ožganih kostnih drobcev prostorsko in posledično kronološko reprezentativen. Vse razlike, povezane z drugimi prostorsko reprezentativnimi vzorci, bi bile odslej predvsem kronološke narave.

Vprašanje razvojne stopnje, ki se mi ne zdi rešeno, je, ali pripadajo mezolitske najdbe s Tržaškega krasa in iz Viktorjevega spodmola kastelnovjenu ali sovterjenu, ne glede na možne ^{14}C datacije (glej tudi Turk, ta zbornik), ki običajno odločilno vplivajo na odločitev o (razvojno kulturni) opredelitvi najdb.

Če posnemam italijanske kolege in primerjam najdbe iz omenjenih najdišč z najdbami iz plasti AC9-AC3 v Romagnanu III, ki sta jih A. Broglio in J. K. Kozłowski umestila v srednji sovterjen, ugotovim pomembnejše razlike v skupini mikrolitov. V Romagnano III je bistveno več segmentov in nič trapezov, in to tako v bloku sedimentov kot v najbogatejšem režnju (razpredelnica 8.3). Pri trikotnikih ni razlike razen te, da so v Romagnanu III precej bolj pogosti enakokraki primerki.

Vsa obravnavana kraška najdišča bi glede na zastopanost segmentov in trapezov težko uvrstil v sovterjen tipa Romagnano III. Vendar lahko pripadajo krajevni različici ali posebni kronološki fazi sovterjena, saj jih na podlagi redkih trapezov ni mogoče brez pomisleka uvrstiti v kastelnovjen. Za kastelnovjen so po navedbah italijanskih kolegov poleg številnih trapezov značilne tudi pravilnejše kline (npr. Montbani) in močnejša koščena obrt kot v sovterjenu.

Vse to je razvidno v M. Triglavci, na Bregu in v najmlajši plasti Pečine pri Bjarču. Tipično kastelnovjensko najdišče, ki združuje vse te zničilnosti in bogato umetnost v plasti nad sovterjenom pa je spodmol Gaban v Trentski kotlini (Kozłowski, Dalmeri 2000).

the space is increased, the number of burned bone fragments exponentially (or linearly or in some other way) rises until I embrace the entire central part of their distribution. With transition to the peripheral part of the distribution, the curve flattens and achieves a steady state (Fig 8.1). From then on, the sample of burned bone fragments is spatially, and consequently chronologically, representative. All differences connected with other spatial representative samples would henceforth be mainly of a chronological nature.

The question of development level, which seems to me unsolved, is whether the finds from the Triestine Karst and from Viktorjev spodmol belong to the Castelnovian or Sauveterrian, regardless of possible ^{14}C dating (see also Turk, this volume), which normally has a decisive influence on the decision about the (developmental cultural) classification of the finds.

If I imitate Italian colleagues and compare the finds from the aforementioned sites with finds from layers AC9-AC3 in Romagnano III, which A. Broglio and J. K. Kozłowski placed in the middle Sauveterrian, I find more important differences in the group of microliths. In Romagnano III there are essentially more segments and no trapezes, both in the block of sediments and in the richest spit (Table 8.3). There is no difference in triangles except that in Romagnano III isosceles specimens are considerably more common.

In view of the representation of segments and trapezes, it would be difficult to classify all the Karst sites discussed into Sauveterrian of the Romagnano III type. However, they could belong to a local variant or special chronological phase of the Sauveterrian, since on the basis of occasional trapezes it is not possible unhesitantly to classify them in the Castelnovian. According to claims of Italian colleagues, in addition to numerous trapezes, more regular blades (e.g. Montbani) and stronger bone craftwork than in the Sauveterrian are also characteristic of the Castelnovian.

All this is evident in M. Triglavca, in Breg and in the youngest layer of Pečina pri Bjarču (*Riparo di Biarzo*). Gaban rockshelter (*Riparo Gaban*) in the Trento basin (Kozłowski, Dalmeri 2000) is a typical Castelnovian site which unites all these charcteristics and rich art in the layers above the Sauveterrian.

9. Opredelitev najdb iz Viktorjevega spodmola

9. Classification of Viktorjev Spodmol

Ivan Turk

Pri opredelitvi najdišča je pomembna njegova časovna in kulturno tehnološka pripadnost.

Pri časovni umestitvi najdišča je na voljo več možnosti, od katerih nobena ni bolj zanesljiva od drugih, je pa glede na okoliščine najprimernejša za takšno umeščanje samo ena Te možnosti nam ponujajo litologija oziroma sedimentologija, paleontologija, arheologija in kronometrija.

Zaradi okrnjenega profila, ki v časovnem intervalu, dolgem več tisoč let (o tem ni dvoma na podlagi arheoloških najdb), ponuja le slab meter debele sedimente, so vse možnosti za temeljito opredelitev najdišča omejene na zelo splošne ugotovitve z majhno časovno in drugo ločljivostjo. Stvar je še toliko bolj zapletena, ker v bližnji okolici ni dobrega referenčnega najdišča za vse naštete raziskovalne panoge skupaj, ampak kvečjemu za vsako posebej, pri čemer izstopata arheologija in kronometrija.

Za dobro referenčno najdišče je osnovni pogoj velika gostota najdb in dobra časovna ločljivost, ki je povezana z debelino sedimentov (in hitrostjo sedimentacije). Ta pogoj izpolnjujejo le redka najdišča, med katerimi je npr. precej oddaljeno najdišče Romagnano III, Trento, Italija (Broglio, Kozłowski 1983) z 8 m debelimi sedimenti, ki vsebujejo najdbe od vključno mezolitika do železne dobe, in bližnje najdišče Podmol pri Kastelcu (Turk *et al.* 1993) s 7 m debelimi sedimenti, ki vsebujejo najdbe od vključno neolitika do srednjega veka. Vendar Podmol ne izpolnjuje večine drugih pogojev, ki se nanašajo na analizo gradiva; Romagnano III jih izpolnjuje, a ne v celoti, sploh pa ne v smislu, da bi imel ustrezno naravi kompleksne kronološke problematike izpeljane analize (glej dalje in Turk 2003) in neodvisno preverjene izsledke različnih raziskav celotnega gradiva.

Začasna terenska **analiza sedimentov** Viktorjevega spodmola je pokazala, da sta v najdišču vsaj dva sedimentacijska dogodka, ki se ne ujemata s plastmi, tako kot sem jih določil v profilu. Meja med obema dogodkoma je nekako na sredini plasti 2. Za sedimente, ki pripadajo starejšemu dogodku, je značilna večja vsebnost klastičnega materiala vseh velikosti (razpredelnica 5.1), kar lahko povežem z močnejšim preperevanjem in/ali hitrostjo sedimentacije. Teh dveh dogodkov za zdaj ne morem argumentirano povezati s klimo. Več možnosti

In classifying a site, its temporal and cultural technological affiliation is important.

With the chronological classification of a site, various possibilities are available, of which none is more reliable than another, but in relation to the circumstances only one is most suitable for such classification. These possibilities are provided by lithology or sedimentology, palaeontology, archaeology and chronometry.

Because of the curtailed profile which, over a period of time several thousand years long (there is no doubt about this on the basis of archaeological finds), only rather less than a metre thick sediment is offered, all the possibilities for a thorough classification of the site are limited to very general findings with small chronological and other resolution. The matter is even more complicated because there is no good reference site in the near vicinity for all the enumerated research branches together, but at most for each individually, in which archaeology and chronometry stand out.

The basic condition for a good reference point is a high density of finds and good temporal resolution, which is connected with the thickness of sediments (and rate of sedimentation). Only a few sites fulfil that condition, which include, e.g., the fairly distant sites of Romagnano III, Trento, Italy (Broglio, Kozłowski 1983) with 8 m thick sediments that contain finds from Mesolithic to Iron Age inclusive, and the nearer site of Podmol pri Kastelcu (Turk et al. 1993) with 7 m thick sediments, containing finds ranging from the Neolithic to the Middle Ages. However, Podmol does not meet the majority of other conditions relating to the analysis of material; Romagnano III fulfils them but not in entirety, and not at all in the sense of having had analyses performed appropriate to the nature of the complex chronological problem (see below and Turk 2003) and independently verified results of different studies of the entire material.

Preliminary fieldwork **analysis of sediments** of Viktorjev spodmol showed that there had been at least two sedimentation events at the site, which are not in conformity with the layers as I determined them in profile. The boundary between the two events is somewhere in the middle on layer 2. For sediments belonging to the older event, a larger content of clastic material is chaza takšne povezave ponujata oba akumulacijska horizonta: v spodnjem delu plasti 2 in v dnu plasti 3. Z njima so povezane tudi prevleke sige na arheoloških najdbah, predvsem na kamenih artefaktih, kar kaže na to, da so arheološke najdbe starejše od klime, v kateri so bili podani pogoji za izločanje sige v omejenem obsegu. Seveda je nemogoče ugotoviti, v kateri vlažni holocenski klimatski fazi je nastal posamezen akumulacijski horizont, v kolikor oba horizonta sploh lahko povezujem s spremembo vlažnosti.

Kar zadeva paleontologijo, ugotavljam naslednje:

Analiza ostankov velikih sesalcev ne ponuja realnih možnosti za spremljanje sprememb v okolju in za posredno časovno umestitev najdišča; je pa pomembna za opredelitev ekonomije skupnosti, ki so živele v najdišču (glej Toškan, Dirjec v tem zborniku).

Analiza ostankov majhnih sesalcev teoretično dopušča možnost za spremljanje okoljskih sprememb in za posredno časovno umestitev najdišča (glej Toškan, Kryštufek v tem zborniku).

B. Toškan (2002) je ugotovil zanesljive in velike razlike med režnji 1–7 (vrh plasti 2, plast 1 in 2) in režnji 8–19 (večinski del plasti 2 in plast 3), ki temeljijo predvsem na zastopanosti gozdnih vrst. Teh je v spodnjem delu profila na splošno več kot v zgornjem delu. Med njimi so tudi take, ki živijo izključno v listnatih gozdovih. Vendar najdbe hrčka v režnju 11 (plast 2) in 18 (plast 3) kažejo tudi na možen obstoj stepe, najdbe dinarske voluharice v režnju 15 in 18 (plast 3) pa na prisotnost kamnišč. Povečevanje travnih površin na račun gozdnih v zgornjem delu profila B. Toškan in B. Kryštufek (ta zbornik) razlagata z vplivom človeka na naravno okolje, ne pa s klimatskimi spremembami. Na podlagi ostankov malih sesalcev tako ni mogoče zanesljivo sklepati o spreminjanju klime, niti ni mogoče najdišča časovno umestiti.

Analiza ostankov ektotermnih vretenčarjev dopušča približno enake teoretične možnosti za spremljanje sprememb v okolju in za posredno časovno umestitev najdišča kot analiza ostankov malih sesalcev (glej Paunović, ta zbornik). Precej zanesljiv paleoekološki kazalec so zelo številni ostanki slepca, ki ves čas odlaganja sedimentov kažejo na obstoj bližnjih vlažnih travnikov in gozda. Preostali ektotermni vretenčarji posredno dokazujejo mešanico različnih okolij v bližini najdišča: listnatega gozda in zaplat odprtih kamnišč ter vlažnih predelov.

Analiza ostankov mehkužcev za zdaj ni dala paleoekoloških in kronoloških rezultatov (glej Slapnik, ta zbornik) navkljub potencialu, ki naj bi ga te najdbe imele (Ložek 1967).

Drugih paleontoloških najdb s pelodom na čelu, ki bi pripomogle k opredelitvi najdišča, ni bilo oziroma jih nismo uspeli vzorčiti.

Izjema so redki **ostanki semen in oglja**, ki smo jih zbrali pri sejanju sedimentov (glej Culiberg, ta zbornik).

racteristic, of all sizes (Table 5.1), which I could link with stronger weathering and/or higher rate of sedimentation. I cannot for the moment argue the connection of these two events with climate. The accumulation horizons offer more possibility for such a linkage: in the lower part of layer 2 and on the bottom of layer 3. The calcite coating on archaeological finds are also connected with them, mainly on stone artefacts, which indicates that the archaeological finds are older than a climate in which conditions were given for the precipitation of calcite in a limited extent. It is of course impossible to establish in which damp Holocene climatic phase an individual accumulation horizon was created, insofar as two horizons can in general be connected with changes of humidity.

As far as palaeontology is concerned, I find the following:

Analysis of the remains of large mammals does not offer real possibilities of monitoring changes in the environment and for indirect chronological classification of the site; but it is important for defining the economy of the communities that lived at the site (see Toškan, Dirjec in this volume).

Analysis of remains of small mammals theoretically allows the opportunity of monitoring environmental changes and indirect chronological classification of the site (see Toškan, Kryštufek in this volume).

B. Toškan (2002) established reliable and major differences between spits 1–7 (top of layer 2, layer 1 and 2) and spits 8–19 (majority of layer 2 and layer 3), which are based above all on the representation of forest species. There are in general more of these in the lower part of the profile than in the upper part. They also include those that live exclusively in deciduous forests. However, finds of grey hamster in spit 11 (layer 2) and 18 (layer 3) also indicates the possible existence of steppe, and finds of Martino's vole in spits 15 and 18 to the presence of a stony environment. B. Kryštufek and B. Toškan (this volume) explain the increasing area of grassland at the expense of forest in the upper part of the profile by the influence of man on the natural environment, and not climatic changes. On the basis of the remains of small mammals, it is thus not possible reliably to reach conclusions about climatic changes, nor is it possible to place the site in time.

Analysis of the remains of ectothermal vertebrates allows approximately the same theoretical possibilities of monitoring changes in the environment and indirect chronological classification of the site as analysis of the remains of small mammals (see Paunović, this volume). Very numerous remains of slow-worms are a fairly reliable palaeological indicator, which demonstrate the existence of nearby damp meadows and forest for the entire time of deposition of sediments. Remaining ectothermal vertebrates indirectly indicate a mixture of various environments in the vicinity of the site: deciduous forest and patches of open stonefields and damp areas.

Vendar se je pozneje pokazalo, da so vsaj semena izključno novodobna in tako bistveno mlajša od plasti, v katerih so bila najdena. To opozarja na možnost, da tudi druge drobne najdbe, razen artefaktov, niso vedno sočasne s sedimentacijo.

Arheološke najdbe so trenutno najprimernejše za časovno in druge opredelitve najdišča, pri čemer je časovna opredelitev osnova za vsa nadaljnja sklepanja o najdišču.

Iz stratigrafskega pregleda vseh arheoloških najdb in najdb samih je razvidno, da sta v najdišču vsaj dve časovno ločeni arheološki fazi: mezolitska (spodnji del plasti 2 in plast 3) in poneolitska prazgodovinska (plast 1 in zgornji del plasti 2). Fazi ni mogoče stratigrafsko ostro razmejiti, saj so najdbe v obeh na določenem stratigrafskem odseku (režnji 6-11) premešane. Mešanje najdb bi bilo lahko posledica zastoja ali vrzeli v sedimentaciji, kar je pričakovati glede na majhno debelino sedimentov. Do tod je rezultat raziskave popolnoma zanesljiv. Od tod dalje pa je veliko negotovosti.

Glede na številčnost in pestrost najdb je zanimiva predvsem mezolitska faza, ki jo bomo z morebitnimi novimi izkopavanji, ki bodo povečala število najdb in popestrila njihov izbor, morda lahko razdelili na dve samostojni razvojni fazi (starejšo in mlajšo).

V zvezi z mezolitskimi najdbami se postavlja vprašanje, kateremu večjemu mezolitskemu kompleksu pripadajo. Glede na geografske, geomorfološke in ekološke povezave z ozemljem bližnjega Tržaškega krasa, pride v poštev samo kompleks sovterjena - (*sauveterrien*, starejši mezolitik) ali kastelnovjena - (*castelnovien*, mlajši mezolitik). Oba kompleksa sta bila razširjena na istem velikem območju, zlasti južno in jugozahodno od Alp, tako da ni razloga, da ne bi segala tudi v zahodno Slovenijo. Tardenoazjenski (*tardenoisien*) kompleks ne pride v poštev, čeprav ga M. Brodar na primer predvideva za zahodno Slovenijo in je v najdišču Pod Črmukljo dva trapeza celo zmotno opredelil kot tardenoajski - (*tardenois*) konici (Brodar 1992, 26, t. 5: 13-14). Prav tako ne pride v poštev noben drug znan mezolitski kompleks in za zdaj tudi ne nova avtohtona skupina.

Ko govorim o mezolitskih kompleksih in povzemam francoske oznake, jih v podrobnostih ne enačim s kompleksi v francoskih *loci tipici*, tako kot jih ne enačijo italijanski kolegi. Ugotavljam samo splošno podobnost in pripadnost. Zato bi lahko govoril tudi o sovteroidnih, kastelnovoidnih in tardenoaidnih najdbah.

Če relativno majhno število trapezov in mikro vbadal ni zgolj naključno, lahko mezolitske najdbe iz Viktorjevega spodmola pripišem sovterjenu. Za kastelnovjen je namreč značilno veliko število asimetričnih trapezov in mikro vbadal (Kozłowski, Dalmeri 2000, tab. 11 in 13), ki so dosti pogosti tudi v starejšem neolitiku. Neolitika pa v Viktorjevem spodmolu, sodeč po keramičnih najdbah, zanesljivo ni, zato ni moglo priti do mešanja mezolitskih in neolitskih najdb kamene obrti.

Analysis of the remains of molluscs has not for the moment given any palaeoecological or chronological results (see Slapnik, this volume) despite the potential that such finds could have (Ložek 1967).

Other palaeontological finds, above all of pollen, which could contribute to defining the site, have not been sampled, or we have not succeeded in sampling.

Occasional **remains of seeds and charcoal** are an exception, which we collected during the sieving of the sediments (see Culiberg, this volume). However, it later appeared that at least the seeds are exclusively of the new age and thus essentially more recent than the layers in which they were found. This draws attention to the possibility of other small finds, too, except for artefacts, not always being contemporary with sedimentation.

Archaeological finds are currently the most suitable for chronological and other classification of the site, whereby chronological classification is the basis for all further conclusions about the site.

From a stratigraphic point of view of all the archaeological finds and the finds themselves, it is clear that there are at least two chronologically distinct archaeological phases: the Mesolithic (lower part of layer 2 and layer 3) and post-Neolithic prehistoric (layer 1 and upper part of layer 2). It is not possible sharply to delineate the phases, since the finds in specific stratigraphic sections (spits 6-11) are mixed. The mixture of finds may be a result of a halt or gap in sedimentation, which is to be expected in view of the small thickness of the sediments. To this point, the results of research are completely reliable. From here on, there is great uncertainty.

In view of the number and diversity of finds, the Mesolithic phase is primarily of interest, which we will perhaps be able to divide into two development phases (older and younger) with possible new excavations that will increase the number of finds and vary their selection.

In connection with Mesolithic finds, the question is raised of which major Mesolithic complex they belong to. In view of the geographic, geomorphologic and ecological connections with the territory of the nearby Triestine Karst, only the Sauveterrian (Early Mesolithic) or the Castelnovian (Late Mesolithic) complexes enter into consideration. Both complexes were widespread in the same large area, especially south and southwest of the Alps, so that there is no reason for them not to have also extended to western Slovenia. The Tardenoisian complex does not enter into respect, although M. Brodar, for example, envisages it for western Slovenia and at the Pod Črmukljo site, two trapezes were even wrongly ascribed as Tardenoisian points (Brodar 1992, 26, Plate 5: 13-14). Similarly, no other known Mesolithic complex can be considered and for now also no new auchthonous group.

When I speak of Mesolithic complexes and adopt French designations, I do not equate them in details with complexes in French *loci tipici*, just as Italian colleagues

Ko sem napisal to in vsa druga poglavja, nisem imel kronometričnih podatkov o Viktorjevem spodmolu. Ker v sondi nismo naleteli na zaključeno celoto oglja v ognjišču, temveč samo na razpršene (zelo mobilne) drobce, se zaradi slabih izkušenj z disperznim ogljem v Divjih babah I nisem odločil za ^{14}C datiranje oglja. Druge najdbe (kosti, semena) se mi iz enakega razloga kot tudi iz drugih (fizikalno-kemijske lastnosti) niso zdele najprimernejše za datiranje. Možnost, da bi prišlo do večje napake pri datiranju, se mi je zdela precej velika. Zato sem menil, da bi bil za eventualno določanje ^{14}C starosti še najprimernejši na kost in/ali artefakt prisigan dovolj velik drobec oglja.

Pri opredeljevanju mezolitskih najdišč ne moremo mimo radiometričnih podatkov, natančneje **^{14}C kronologije**.

Izbor 2279 do vključno leta 1989 objavljenih ^{14}C letnic za pozni paleolitik, mezolitik in zgodnji neolitik iz vse Evrope (Gob 1990) predstavlja dobro osnovo za (globalno) kronologijo mezolitika. Obenem ta izbor, analiziran po navedenih obdobjih (Gob 1990, 203 ss in sl. 3-5) zelo nazorno pokaže, koliko in kakšnih napak lahko pričakujemo pri ^{14}C datiranju, saj je znano, da so vse ^{14}C letnice pomlajene, nekatere bolj druge manj.

V poznem paleolitiku je bila po seznamu, ki ga navaja A. Gob, napačna (beri evidentno premlada) približno polovica datacij, v mezolitiku kakšnih 13 % in v zgodnjem neolitiku praktično nobena. Red pomladitve ^{14}C letnic (vse letnice so BP) je lahko tako velik, da padejo posamezna paleolitska najdišča v mezolitik in nekatera mezolitska v kovinska obdobja. Starejša ko so najdišča, bolj pereča je nevarnost pomladitve dejanske starosti zaradi različnih vzrokov (Nelson 1997, 55). Vzrok za napake v datiranju je zelo težko ugotoviti. Ugotavljanje vzroka se mi niti ne zdi pomembno. Pomembno je vedeti, da je neka letnica napačna.

Za čas zadnjih 13-14 let, ko je bilo nedvomno narejenih še veliko ^{14}C datacij mezolitskih najdišč, mi ni znana nobena podrobna statistična analiza teh datacij, ki bi dopolnila temeljno študijo A. Goba. Za italijanska najdišča v pokrajini Trentino Alto Adige se po stanju leta 1998 navaja več kot 100 radiometričnih datumov za obdobje od konca paleolitika do začetka neolitika (Dalmeri, Lanzinger 2001, 15), kar vsekakor ni ravno velika številka glede na število najdišč.

Prepričan sem, da kronometrija ne ponuja enostavne rešitve v smislu enačenja mezolitskih kompleksov in/ali skupin s kronometričnimi enotami, konkretno radiometričnimi podatki, ali z biostratigrafskimi enotami, konkretno pelodnimi zonami kot so: ... drijas III, preboreal, boreal, atlantik ... Tako kot podobni kompleksi in skupine najdb niso nujno sočasni, tudi približno enake datacije različnih kompleksov in skupin najdb še ne pomenijo, da so ti sočasni, in obratno različne datacije podobnih kompleksov in skupin nujno ne pomenijo, da so ti različno stari. Vendar lahko temu navzlic dovolj

do not equate them. I find only general similarities and affiliation. So I can also speak of Sauveterroid, Castelnovoid and Tardenoid finds.

If the relatively small number of trapezes and microburins is not merely coincidental, we can ascribe the Mesolithic finds from Viktorjev spodmol to the Sauveterrian. The Castelnovian, namely, is characterised by a large number of asymmetric trapezes and microburins (Kozłowski, Dalmeri 2000, Plate 11 and 13), which are also common enough in the early Neolithic. However, judging by pottery finds, there is certainly no Neolithic in Viktorjev spodmol, so there could not have been a mixing of Mesolithic and Neolithic finds of stone craftware.

When I wrote this and all other chapters, I did not have chronological data about Viktorjev spodmol. Since in the test trench we did not come across any closed find of charcoal in a hearth but only scattered (very mobile) fragments, because of bad experience with scattered charcoal in Divje babe I, I decided not to ^{14}C date the charcoal. Other finds (bones, seed) did not seem to me very suitable for dating for the same reason, as well as others (e.g. physical and chemical properties). The possibility of there being a major error in dating seemed to me too great. I therefore believed that for possible determination of the ^{14}C age, a large enough piece of charcoal attached to bone and/or artefact would be much more suitable.

In determining Mesolithic sites, we cannot overlook radiometric data, more precisely the **^{14}C chronology**.

The selection of 2279 ^{14}C dates published up to and including 1989 for the Late Palaeolithic, Mesolithic and Early Neolithic from the whole of Europe (Gob 1990) provides a good basis for a (global) chronology of the Mesolithic and, at the same time, this selection, analysed for the cited periods (Gob 1990, 203 ss and Fig. 3-5) very eloquently shows how many and what kind of mistakes can be expected in ^{14}C dating, since it is known that all ^{14}C dates are too recent, some more than others.

According to the list cited by A. Gob, approximately half the dates in the late Palaeolithic were wrong (clearly too recent), some 13% in the Mesolithic and in the early Neolithic practically none. The order of 'rejuvenation' of ^{14}C dates (all dates are BP) can be so big that individual Palaeolithic sites are put into the Mesolithic and some Mesolithic into the Iron Age. The older the site, the greater the danger of 'rejuvenating' the actual age, for various reasons (Nelson 1997, 55). The cause of the error in dating is very difficult to establish. Finding the cause does not seem to me important. It is important to know that some dates are wrong.

For the period of the last 13-14 years, when far more ^{14}C datings of Mesolithic sites have been done, no detailed statistical analysis of these data is known to me that would supplement the thorough study of A. Gob. More than 100 radiometric dates for the period from zanesljivo ocenimo globalno ^{14}C starost mezolitskih kompleksov, ne glede na vprašljivost posamičnih starosti, če imamo za to dovolj radiometričnih podatkov.

Sovterjen(ski kompleks) se umešča na podlagi številnih radiometričnih datacij med 9600 BP in 7800 (ali 7600) BP (Gob 1990, 37). To pomeni da pade v ta časovni interval tudi mezolitski nivo v Viktorjevem spodmolu, če ga na podlagi tipološko-tehnoloških kriterijev opredelim kot sovterjenskega. Neposredno datiranje najdišča bi lahko takšno umestitev ovrglo, vendar ne bi nikoli vedel ali je (so) datacija(e) pravilna(e). V primeru nižje ^{14}C določene starosti, ki bi jo sprejel kot pravilno po zgledu ustaljene arheološke prakse, bi moral najdišče opredeliti za kastelnovjensko. S tem dejanjem pa bi vstopil v začarani krog kronometrije in arheološke metodologije, kjer se, pri najdiščih brez prave stratigrafske ločljivosti tipološko-tehnološke značilnosti, ki opredeljujejo arheološke komplekse in skupine, kompromisno podrejajo kronometriji. Brez prave stratigrafske ločljivosti je velika večina mezolitskih najdišč južno od Alp, primer kompromisnega in tveganega ravnanja pa sem zasledil že v naši neposredni soseščini pri opredeljevanju najdišč na Tržaškem krasu (glej Guerreschi 1998, 84). Od uvedbe metod radiometričnega določanja starosti je takšno ravnanje, žal, postalo del splošne arheološke prakse.

Če je kastelnovjen, sodeč po redkih trapezih, zastopan tudi v Viktorjevem spodmolu, potem ga lahko nedvomno povežem s kastelnovjensko skupino Tržaškega krasa v ožjem smislu in z mediteranskim jedrom kastelnovjena v širšem smislu.

Kastelnovjen se je razmahnil po celi Evropi med 8000 BP in 7800 BP (glej tudi Broglio, Kozłowski 1983; Broglio 1984, 287; Kozłowski, Dalmeri 2000, 13). Teh dvesto let predstavlja mejnik med starejšim in mlajšim mezolitikom (Gob 1990, 50). V mlajšem mezolitiku se prične tudi neolitizacija Evrope, ki se z redkimi izjemami konča konec 7. tisočletja BP (prav tam).

Kastelnovjen je v Franciji in Italiji trajal na podlagi številnih ^{14}C datacij od 8140 do 6020 BP (Gob 1990, 39). Širše gledano je sestavljen iz več regionalno omejenih skupin, podobno kot sovterjen (Broglio 1984, 291). Metodologija, ki je bila podlaga za osnovanje skupin, in od katere je odvisno ugotavljanje podobnosti/različnosti mezolitskih inventarjev, je po mojem vprašljiva. Če italijanski avtorji imenujejo svoj sovterjen in kastelnovjen 'italski' (Bagolini *et al.* 1983; Alessio *et al.* 1983; Broglio 1984, 291), kakšen je potem naš mezolitik, če se v splošnem in podrobnostih razlikuje od 'italskega' in od najdišča do najdišča?

Tukaj prevzeti radiometrični datumi za mezolitik južno od Alp se ne ujemajo povsem z datumi za posamezna t. i. referenčna najdišča v Italiji, kar je statistično gledano popolnoma razumljivo. Večja razhajanja so zlasti pri

the end of the Palaeolithic to the start of the Neolithic are given for Italian sites in the province of Trentino Alto Adige according to the state in 1998 (Dalmeri, Lanzinger 2001, 15), which is not actually such a large number in view of the number of sites.

I am sure that chronometry does not offer a simple solution in the sense of equating Mesolithic complexes and/or groups with chronometric units, specifically radiometric data or with biostratigraphic units, specifically pollen zones such as: ... Dryas III, Preboreal, Boreal, Atlantic ... Just as similar complexes and groups of finds are not necessarily contemporary, even approximately the same dating of similar complexes and groups does not mean that these are contemporary and, conversely, different datings of similar complexes and groups of finds does not necessarily mean that these are of different ages. However, in spite of that, we can sufficiently reliably assess the global ^{14}C age of Mesolithic complexes, regardless of the questionable nature of individual ages if we have sufficient radiometric data for this.

The Sauveterrian (complex), on the basis of numerous radiometric datings, is placed between 9600 BP and 7800 (or 7600) BP (Gob 1990, 37). This means that the Mesolithic level in Viktorjev spodmol also falls within this time interval, if we classify it as Sauveterrian on the basis of typological and technological criteria. Direct dating of the site could overthrow such a placing, but we could never know whether the dating(s) is/are accurate. In the case of a lower ^{14}C determined age, which we would accept as accurate on the example of established archaeological practice, the site would have to be defined as Castelnovian. With that act we would enter the charmed circle of chronometry and archaeological methodology, by which with sites without real stratigraphic differentiality, we compromise subordinate typological-technological characteristics by which archaeological complexes and groups are defined, to chronometry. Without real stratigraphic differentiality, the great majority of Mesolithic sites south of the Alps are a case of compromise and risky behaviour that I have already outlined in our immediate vicinity in classifying sites on the Triestine Karst (see Guerreschi 1989-1999, 84). Since the introduction of methods of radiometric dating, such behaviour has unfortunately become part of general archaeological practice.

If Castelnovian, judging by the few trapezes, is represented in Viktojev spodmol, then we can undoubtedly link it with the Castelnovian groups of the Triestine Karst in the narrower sense and with the Mediterranean core of the Castelnovian in the wider sense.

The Castelnovian flourished throughout Europe between 8000 BP and 7800 BP (see also Broglio, Kozłowski 1983; Broglio 1984, 287; Kozłowski, Dalmeri 2000, 13). These two hundred years represent the boundary between kastelnovjenu, katerega začetek je 400-500 let mlajši od začetka, ki ga navaja A. Gob (glej Bagolini *et al.* 1983; Biagi, Spataro 1999-2000). To bi vsaj ponekod lahko kazalo na daljšo poselitveno vrzel (glej Biagi, Spataro 1999-2000). O kronometričnih vrzelih bom spregovoril v nadaljevanju.

Ko sem tako arheološko opredelil najdbe in posredno določil njihovo starost, mi ostane še **kronostratigrafska opredelitev** plasti z mezolitskimi najdbami. Pri tem si lahko pomagam samo s kronometrijo, pri čemer se dobro zavedam vprašljivosti enačenja kronostratigrafskih oziroma biostratigrafskih enot s kronometričnimi enotami, v kolikor to ni podprto s statistično analizo resnično velikega števila podatkov.

Meja med pleistocenom (konec pelodne zone drijas III) in holocenom (začetkom pelodne zone preboreal) je 10 000 BP in ni sporna. Za preboreal, boreal in atlantik se navajajo različni kronometrični mejniki. Vendar se starejši mezolitik (sovterjenski kompleks) splošno postavlja v preboreal in predvsem v boreal, mlajši mezolitik (kastelnovjenski kompleks) pa v starejši del atlantika. Kakšen je bil razvoj vegetacije, predvsem gozdne, v omenjenih kronostratigrafskih odsekih v Sloveniji, je ugotovil A. Šercelj (1996), zato ga na tem mestu ne bom ponavljal. Moram pa poudariti, da se rezultati vseh paleontoloških analiz v Viktorjevem spodmolu ujemajo z ugotovitvami A. Šerclja o širjenju in sestavu gozda v obravnavanem obdobju.

V dosedanjem izvajanju ni bil govor o **tardenoazjenu**, ki se v naši literaturi večkrat omenja v zvezi z mezolitikom v Sloveniji. Tako je M. Brodar (1979, 27) več let po izkopavanju Pod Črmukljo napisal, da so naša mezolitska najdišča tardenoazjenskega značaja. Pri objavi najdb iz Pod Črmuklje je to izjavo nekoliko dopolnil, češ da je bil mišljen tardenoazjen v širokem smislu (Brodar 1992, 29). Kako trdno je bila zakoreninjena misel o tardenoazjenu dokazuje dejstvo, da je v isti objavi pomotoma opredelil dva trapeza s trorobim trnom (*piquant-trièdre*), izdelana z mikrovbadalno tehniko, kot tardenojski konici (Brodar 1992, t. 5: 13-14). Oblika in retuša obeh primerkov, da ne govorim o načinu izdelave artefakta, nikakor ne ustrezata značilnostim tardenojske konice (glej Rozoy 1978a, 233, sl. 1: 17-21; G.E.E.M. 1972, 370 s, sl. 6-7).

O tardenoidni komponenti v Jami na Sedlu - *Grotta Benussi* na Tržaškem krasu in tardenoidnem kompleksu v Romagnano III je nekoč razmišljal tudi A. Broglio (1971), vendar je pozneje to misel opustil (Broglio 1984). Podlaga za takšno in podobna razmišljanja bi bili lahko trapezi, izdelani v mikrovbadalni tehniki, ki so dejansko bogato zastopani tudi v tardenoazjenu (G.E.E.M. 1969), vendar so sočasno močno razširjeni v različnih kulturnih sredinah od začetka 8. tisočletja pred sedanjostjo naprej (Löhr 1994). Zato sami po sebi ne predstavljajo

the Early and Late Mesolithic (Gob 1990, 50). The Neolithisation of Europe also started in the Late Mesolithic, which with few exceptions was completed by the end of the 7th millennium BP (ibid).

The Castelnovian in France and Italy, on the basis of numerous ^{14}C datings, lasted from 8140 to 6020 BP (Gob 1990, 39). Seen more widely, it is composed of a number of regionally restricted groups, similar to the Sauveterrian (Broglio 1984, 291). The methodology that was the basis for founding groups and from which depends the finding of similarities/differences in the Mesolithic inventory, is in my opinion dubious. If Italian authors call their Sauveterrian or Castelnovian "Italic" (Bagolini et al. 1983; Alessio et al. 1983; Broglio 1984, 291), what kind is therefore our Mesolithic, if in general and in details it differs from the "Italic" and from site to site?

The radiometric dates for the Mesolithic south of the Alps taken here do not entirely conform to the dates for individual, so-called reference sites in Italy, which is entirely understandable seen statistically. There are greater disagreements especially with the Castelnovian, whose start is 400-500 years later than the start cited by A. Gob (see Bagolini et al. 1983; Biagi, Spataro 1999-2000). This could at least in part indicate a longer settlement gap (see Biagi, Spataro 1999-2000). We will discuss chronometric gaps below.

When I thus defined the finds archaeologically and indirectly determined their age, I was left with a **chronostratigraphic determination** of layers with Mesolithic finds. Only chronometry can assist, in which I am well aware of the dubiousness of equating chronostratigraphic or biostratigraphic units with chronometric units insofar as this is not supported by statistical analysis of a seriously large amount of data.

The boundary between the Pleistocene (end of the Dryas III pollen zone) and the Holocene (start of the Preboreal pollen zone) is 10,000 BP and is not disputed. Various chronometric boundaries are stated for the Preboreal, Boreal and Atlantic. However, the earlier Mesolithic (Sauveterrian complex) is generally placed in the Preboreal and above all in the Boreal, and the later Mesolithic (Castelnovian complex) is the earlier part of the Atlantic. What the development of vegetation, mainly forest, was in the limited chronostratigraphic sections in Slovenia was established by A. Šercelj (1996), so I will not repeat it here. But I must stress that the results of all palaeontological analyses in Viktojev spodmol conform with A. Šercelj's findings on the spread and composition of forest in the period under discussion.

There has not been any discussion here of the **Tardenoisian,** which is often mentioned in Slovene literature in connection with the Mesolithic in Slovenia. M. Brodar (1979, 27) thus several years after excavating Pod Črnajdbe z diagnostičnim kronološkim in posredno 'kulturološkim' predznakom.

Gradivo najdišč, ki ga je proučil M. Brodar, je osiromašeno z mikrolitskimi armaturami, saj te komaj presegajo 10 % vseh ugotovljenih orodij (Breg 11 %, Pod Črmukljo 6 % ali 8 %) , medtem ko se deleži mikrolitskih armatur v Viktorjevem spodmolu od 26 % do 33 % in v M. Triglavci 41 % (glej razpredelnico 8.1). J.- G. Rozoy (1978 b, 15) navaja vrednosti 15-25 %, vendar je treba poudariti, da imajo tuja najdišča bistveno več retuširanih odbitkov kot Viktorjev spodmol in M. Triglavca.

Na Bregu in Pod Črmukljo prevladujejo večje armature, predvsem trapezi, ki lahko delujejo zavajajoče pri opredeljevanju gradiva. Vendar med armaturami ni oblik, ki so značilne izključno za tardenoazjen (Galiński 1997, sl. 23).

Najdbe iz Viktorjevega spodmola in nove najdbe iz M. Triglavce so dopolnile podobo, znano iz Pod Črmuklje, in tudi spremenile razmerje med mikroliti in drugimi orodji v prid mikrolitom. Splošen značaj teh najdb je sovterjensko-kastelnovjenski, ne pa tardenoazjenski. Celo trapezi so bolj podobni sovterjenskim kot tardenoazjenskim oblikam (glej Galiński 1997, sl. 15-22 in 23-38 in Rozoy 1978b, t. 138c za tardenoazjenske trapeze). Podobnost z italskim sovterjenom in kastelnovjenom je tako velika, da bi bila vsakršna drugačna razlaga v nasprotju z ugotovitvami naših sosedov, ki so domnevno preverjene v številnih najdiščih severne Italije.

Kar zadeva koščene izdelke in umetnost pa samo tole. Tardenoazjen ima morda več koščenih izdelkov kot sovterjen (Galiński 1997, sl. 15-22 in 23-38). Po tej plati bi lahko bila nekatera slovenska najdišča na neki način povezana s tardenoazjenom. Vendar nas je v zadnjem času tudi kastelnovjen presenetil z bogato koščeno obrtjo in umetnostjo (Kozłowski, Dalmeri 2000).

Mislim, da je za razlikovanje med sovterjensko-kastelnovjenskim in tardenoazjenskim kompleksom poleg tipološkega kriterija najzanesljivejši geografski. Alpe predstavljajo mejo med obema kompleksoma (glej Galiński 1997, karta 1) kot tudi področje, kjer so se lahko mešali vplivi, ki so od severa prodirali z ozemlja tardenoazjena in od juga z ozemlja sovterjena in kastelnovjena (Broglio 1984, 305).

Na koncu moram s kronostratigrafskega vidika analizirati še **referenčno najdišče Romagnano III**, ki je služilo pri opredeljevanju mezolitskih najdišč na Tržaškem krasu (Broglio 1980) in v Dolomitih (Broglio 1984, 296) in bi ga glede na to lahko uporabil tudi za opredelitev mezolitskih najdb v Viktorjevem spodmolu. Vendar menim, da to ne bi bila primerna rešitev. Namreč.

Romagnano III je resnično izjemno bogato najdišče, ima pa kot referenčno veliko pomanjkljivost, ki jo italijanski avtorji ne upoštevajo. A. Broglio in S. K. Kozłowski (1983) sta z analizo mezolitskega gradiva ugotovila v najdišču več razvojnih faz. Prepričana sta,

mukljo wrote that our Mesolithic sites have a Tardenoisian character. In publishing the finds from Pod Črmukljo, he slightly enlarged on this statement, that he had been thinking of the Tardenoisian in the wide sense (Brodar 1992, 29). How firmly the idea of the Tardenoisian was rooted is shown by the fact that in the same publication, two trapezes with *piquant-trièdre*, produced with a microburin technique, were mistakenly identified as Tardenoisian points (Brodar 1992, Plate 5: 13-14). The form and retouch on both specimens, to say nothing of the way of making the artefacts, in no way corresponds to typical Tardenoisian points (see Rozoy 1978a, 233, Fig. 1: 17-21; G.E.E.M. 1972, 370 s, Fig. 6-7).

A. Broglio (1971) formerly also considered Tardenoisian components in Jama na Sedlu - *Grotta Benussi* on the Triestine Karst and a Tardenoisian complex in Romagnano III though he later abandoned this idea (Broglio 1984). The basis for such and similar thinking may have been trapezes made with a microburin technique which are actually richly represented also in the Tardenoisian (G.E.E.M. 1969), although they are contemporaneously strongly widespread in various cultural centres from the beginning of the 8th millennium BP onwards (Löhr 1994). So they do not in themselves represent finds with diagnostic chronological and, indirectly, "culturological" significance.

The material of sites that M. Brodar studied is impoverished of microlithic armatures, since they barely exceed 10% of all established tools (Breg 11 %, Pod Črmukljo 6 % or 8 %) , while the share of microlithic armatures in Viktorjev spodmol is from 26% to 33 % and in M. Triglavca 41 % (see Table 8.1). J.- G. Rozoy (1978 b, 15) states values of 15-25 %, but it must be stressed that foreign sites have essentially more retouched flakes than Viktorjev spodmol and M. Triglavca.

Larger armatures predominate at Breg and Pod Črmukljo, mainly trapezes, which could be more binding in classifying material. However, there are no shapes among armatures that are characteristic exclusively for the Tardenoisian (Galiński 1997, sl. 23).

The finds from Viktorjev spodmol and new finds from M. Triglavca have supplemented the picture, known from Pod Črmukljo, and also changed the ratio between microliths and other tools in favour of microliths. The general character of these finds is Sauveterrian-Castelnovian, and not Tardenoisian. Even the trapezes are more similar to Sauveterrian that Tardenoisian in shape (see Galiński 1997, Fig. 15-22 and 23-38 and Rozoy 1978b, Plate 138c for Tardenoisian trapezes). The similarity with 'Italic' Sauveterrian and Castelnovian is so great that any kind of other interpretation would be in conflict with the findings of our neighbours, which have presumably been checked in numerous sites in northern Italy.

As far as bone products and art are concerned, only this. Tardenoisian has perhaps more bone products than Sauveterrian (Galiński 1997, Fig. 15-22 and 23-38).

da so bile vse razvojne faze, razen tiste v plasti AC5, neprekinjene (prav tam, 144 in op. 10).

Vse mezolitske plasti so kronometrično opredeljene s 17 radiometričnimi datumi (Alessio et.al. 1983, 249), ki se dobro skladajo s stratigrafijo. Večje odstopanje je opaziti v plasti Ab 1-2, kjer so bili izjemoma datirani trije vzorci. Eden od njih odstopa za 350 do 300 ^{14}C let od drugih dveh. To potrjuje možnost za obstoj prikritih napačnih (pomlajenih) datacij in nikakor ni osamljen primer v datiranih večplastnih mezolitskih najdiših v Italiji in drugje (glej Kozłowski, Dalmeri 2000, tab 2; Spataro 2002, 21). Če predpostavljam, da so drugi datumi pri najdišču Romagnano III vsaj približno pravilni, ugotovim med njimi pet časovnih vrzeli, ki si takole sledijo od spodaj navzgor (sl. 9.1).

- 1. Med plastjo AE 1-4 (starejša faza sovterjena) in AC 8-9 (srednja faza sovterjena) je vrzel, dolga 400 ^{14}C let. V tem času se je odložila (interstratificirala) aluvialna plast AD med obe datirani plasti s sovterjenskimi najdbami. Aluvialna plast AD zelo verjetno predstavlja 'trenutni' dogodek v smislu ločljivosti ^{14}C metode. Na časovno vrzel torej ni mogla vplivati, razen če je bila s tem dogodkom povezana erozija neznane debeline sedimentov, ki so ali niso vsebovali sovterjenske najdbe starejše faze.
- 2. Med plastjo AC 5-6 (srednji sovterjen) in AC 4 (srednji sovterjen) je vrzel, dolga 350 ^{14}C let. A. Broglio in S. K. Kozłowski (1983, 124) na podlagi analize mezolitskega gradiva ugotavljata v plasti AC 5 'nepravilen značaj sovterjena'. Vzrok za nepravilnost bi lahko bila po mojem časovna vrzel.
- 3. Med plastjo AC 2 (mlajši sovterjen) in AC 1 (mlajši sovterjen) je vrzel, dolga 440 ^{14}C let. V sestavu sovterjenskega inventarja so na tem kronološkem odseku, podobno kot na prejšnjem, vidni večji ali manjši odmiki (Broglio, Kozłowski 1983, sl. 26-33), ki pa jim A. Broglio in S.K. Kozłowski tokrat ne posvečata posebne pozornosti.
- 4. Med plastjo AB 3 (pomešan sovterjen in kastelnovjen) in AB 1-2 (starejši kastelnovjen) je vrzel, dolga 290-640 ^{14}C let. V mezolitskem inventarju so na tem kronološkem odseku opazni večji ali manjši odmiki (prav tam, sl. 26-33), ki jih A. Broglio in S.K. Kozłowski ne omenjata. Mezolitske najdbe v plasti AB 3 so po njunem mnenju pomešane, na kar ju je napotil rezultat klasterske analize zastopanosti posameznih mezolitskih najdb (prav tam, sl. 35 in 36). Pomešanost najdb razlagata z vrzeljo med plastjo AC1 in AB 1-2 (prav tam, op. 9). Glede na ^{14}C datacije in domnevno pomešanost najdb v plasti AB 3 menim, da je takšna stratigrafska umestitev vrzeli napačna. Vrzel je kvečjemu med plastjo AB 3 in AB 1-2.
- 5. Med plastjo AB 1-2 (starejši kastelnovjen) in AA1-2 (mlajši kastelnovjen) je vrzel, dolga 320-

From this aspect, some Slovene sites could have been in some way connected with the Tardenoisian. However, recently the Castelnovian has also produced surprises, with a rich bone craft and artistry (Kozlowski, Dalmeri 2000).

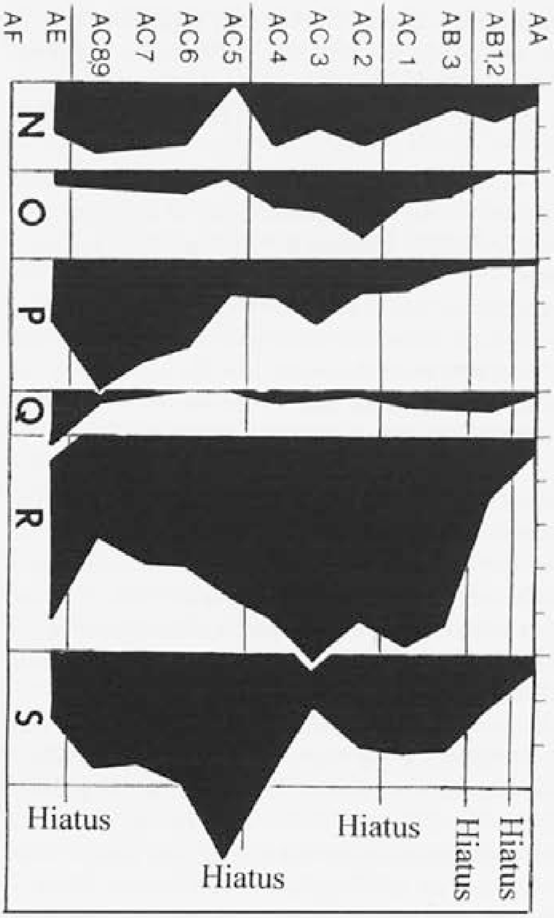
I think that for distinguishing between Sauveterrian-Castelnovian and Tardenoisian complexes, geographic criteria in addition to typological are the most reliable. The Alps represent the boundary between the two complexes (see Galiński 1997, map 1) as well as an area in which influences could have mixed, which would have advanced from the north from the territory of Tardenoisian and from the south from the territory of Sauveterrian and Castelnovian (Broglio 1984, 305).

Finally, I must analyse from a chronostratigraphic point of view the **reference site Romagnano III**, which served in defining Mesolithic sites on the Triestine Karst (Broglio 1980) and in the Dolomites (Broglio 1984, 296) and in view of that could also be used for classifying Mesolithic finds in Viktorjev spodmol. However, I believe that this would not be a suitable solution. Namely:

Romagnano III is really an exceptionally rich site, but as a reference has a great many deficiencies which Italian authors do not take into account. A. Broglio and S. K. Kozłowski (1983) found with the analysis of the Mesolithic material in the site a number of phases. They are sure that all development phases, except those in layer AC5, were unbroken (ibid, 144 and op. 10).

All Mesolithic layers are chronometrically defined with 17 radiometric dates (Alessio et al. 1983, 249), which accord well with the stratigraphy. Greater deviation can be seen in layer Ab 1-2, where three samples were exceptionally dated. One of them deviates by 350 to 300 ^{14}C years from the other two. This confirms the possibility of the existence of hidden errors (rejuvenation) of the dating and is by no means an isolated example in dating multi-layer Mesolithic sites in Italy and elsewhere (see Kozlowski, Dalmeri 2000, Tab 2; Spataro 2002, 21). If a presume that other dates at the Romagnano III site are at least approximately correct, I find among them five time gaps, which follow from below upwards (Fig. 9.1):

- 1. Between layer AE 1-4 (earlier phase of the Sauveterrian) and AC 8-9 (middle phase of the Sauveterrian) there is a gap 400 ^{14}C years long. During this time, the alluvial layer AD was deposited (interstratified) between the two dated layers with Sauveterrian finds. The alluvial layer AD probably represents a 'momentary' event in the sense of the distinguishing capacity of the ^{14}C method. It could not have influenced the time gap, therefore, unless the erosion of an unknown thickness of sediments, which did or did not contain Sauveterrian finds of the earlier phase, was connected with this event.



Sl. 8.1: Romagnano III: mikrolitske armature (N-R) in hiati. Prirejeno po Broglio, Kozłowski 1983, sl. 27.
Fig. 8.1: Romagnano III: Microlithic armatures (N-R) and hiatuses. Modified after Broglio, Kozłowski 1983, Fig. 27.

370 ^{14}C let. V kastelnovjenskem inventarju so na tem kronološkem odseku prav tako vidni večji ali manjši odmiki (prav tam, sl 26-33).

Zaradi možnosti številnih vrzeli v mezolitskih plasteh najdišča Romagnano III, ki obsegajo od 54-66 % časa, v katerem so se odložile vse mezolitske plasti (9830-6480 BP), je nesmiselno deliti sovterjenske in kastelnovjenske inventarje na faze kot jih predlagata A. Broglio in S. K. Kozłowski. Takšna delitev je lahko popolnoma umetna, kajti v profilu najdišča so lahko še najmanj tri plasti, ki imajo podobne lastnosti, kot sta jih avtorja razvojnih faz ugotovila v plasti AB 3. To pa je plast, ki jo pri delitvi na faze ne upoštevata zaradi domnevne pomešanosti najdb iz dveh različnih časovnih obdobij.

Podobna zgodba o kronometričnih vrzelih in krožnih dokazih se ponovi pri bližnjem najdišču Gaban (Kozłowski, Dalmeri 2000) in verjetno še kje.

Jasno je, da ni edini vzrok za variabilnost mezolitskega inventarja razvoj, ki bi časovno potekal povsod enako. Res pa je, da je tesno povezan s časom. Zato sta

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- 2. Between layers AC 5-6 (mid-Sauveterrian) and AC 4 (mid-Sauveterrian) is a gap of 350 ^{14}C years. A. Broglio and S. K. Kozłowski (1983, 124), on the basis of analysis of Mesolithic material, find an 'irregular character of Sauveterrian' in layer AC 5. The cause of the irregularity may the the time gap.
- 3. Between layers AC 2 (later Sauveterrian) and AC 1 (later Sauveterrian) is a gap of 440 ^{14}C years. In the composition of the Sauveterrian inventory, in this chronological section, as in the previous one, greater or lesser shifts are visible (Broglio, Kozłowski 1983, Fig. 26-33), but to which A. Broglio and S.K. Kozłowski do not devote particular attention.
- 4. Between layers AB 3 (mixed Sauveterrian and Castelnovian) and AB 1-2 (earlier Castelnovian) is a gap of 290-640 ^{14}C years. Greater or lesser shifts are visible in the Mesolithic inventory in this chronological section (ibid, Fig. 26-33), which A. Broglio and S.K. Kozłowski do not mention. The Mesolithic finds in AB 3, in their opinion, are mixed, to which the result of cluster analysis of the representation of individual Mesolithic finds (ibid, Fig. 35 and 36) pointed. They interpret the mixture of finds by gap between layers AC1 and AB 1-2 (ibid, op. 9). In view of ^{14}C dating and the suspected mixture of finds in layer AB 3, I believe that such a stratigraphic placing of the gap is mistaken. The gap is at the most between layers AB 3 and AB 1-2.
- 5. Between layers AB 1-2 (earlier Castelnovian) in AA1-2 (later Castelnovian) is a gap of 320-370 ^{14}C years. In the Castelnovian inventory in this chronological section larger or smaller shifts are similarly visible (ibid. Fig. 26-33).

Because of the possibility of numerous gaps in the Mesolithic layers of the Romagnano III site, which could cover from 54-66 % of the time span in which all Mesolithic layers were deposited (9830-6480 BP), it is senseless to divide the Sauveterrian and Castelnovian inventories into phases as A. Broglio and S. K. Kozłowski propose. Such a division would be completely artificial, since in the profile of the site there could be at least three more layers having similar properties to those the authors find for the development phases in layer AB 3. But they do not take this layer into account in the division into phases because of the suspected mixture of finds from two different time periods.

A similar story of chronometric gaps and circular evidence is repeated in the nearby site of Gaban (Kozłowski, Dalmeri 2000) and probably elsewhere.

It is clear that development which is supposed to have taken place temporally everywhere the same is not the only cause of the variability of the Mesoltihic inventory. It is true that it is closely linked with time. Successive events and their temporal separability are therefore extremely important for understanding the development.

zaporedje dogodkov in njihova časovna ločljivost izredno pomembna za razumevanje razvoja.

V najdišču Romagnano III vse kategorije mezolitskih najdb bolj ali manj variirajo, kar je običajno. V bližnjem najdišču Predestel, ki ima skoraj 4 m debele mezolitske plasti, podobne kategorije primerljivih mezolitskih najdb, ki so ^{14}C datirane v isti časovni interval, variirajo drugače (Alessio 1983, 248) in tako naprej.

Če bi hoteli dobiti kolikor toliko zanesljive razvojne faze mezolitika v neki regiji, bi morali ravnati tako, kot sem nakazal na primeru Divjih bab I (Turk 2003). Potrebovali bi torej vsaj 20–30 podobnih najdišč kot je Romagnano III, ki bi morala biti tudi sedimentološko primerno obdelana, kar Romagnano III zanesljivo ni. Treba bi bilo tudi marsikaj spremeniti v glavah tistih, ki so dejavni na terenu, kajti vsakršna problematika se začne reševati na terenu in se tam tudi konča, če stvari niso zastavljene tako, kot to zahteva problem. Na to so posamezniki opozarjali že pred več kot 30 leti (Payne 1972 b), a so ta opozorila bore malo zalegla.

Kljub pomanjkljivostim referenčnega najdišča Romagnano III, so (lahko) v inventarju sovterjenskih in kastelnovjenskih plasti naslednje razlike:

- V kastelnovjenu je več retuširanih klin kot odbitkov (Broglio, Kozłowski 1983, sl. 26), kar je lahko povezano s povečano proizvodnjo klin (prim. Broglio 1984, 287).
- V kastelnovjenu je manj segmentov, trikotnikov, sovterjenskih konic in veliko trapezov (prav tam, sl. 27). Z izdelavo trapezov so povezana mikro vbadala. Zato bi moralo biti v kastelnovjenu njihovo število večje, kar je vidno v najdišču Gaban (Kozłowski, Dalmeri 2000, tab. 11).
- V kastelnovjenu je manj enakostraničnih trikotnikov (prav tam, sl. 32).

Vprašanje je, koliko se te razlike ponavljajo pri drugih najdiščih iz istega časa, ki imajo profile sestavljene iz več plasti. V najdišču Gaban, ki je blizu Romagnana III, gornje navedbe nesporno veljajo samo za razmerje retuširane kline/odbitki in za trapeze, manj za druge mikrolite (Kozłowski, Dalmeri 2000, tab. 12–13). Zato bi bilo metodološko zgrešeno, če bi mezolitska najdišča, ki imajo tako kot Viktorjev spodmol omejeno število plasti, kronološko opredelil samo na podlagi radiometrije in podobnosti/različnosti z mezolitskim inventarjem najdišč, kot sta na primer Romagnano III in Gaban, ne da bi se prej na ustrezen način prepričal, kako zanesljive so faze razvoja v 'referenčnem' profilu, in tako posredno preveril tudi radiometrične datacije.

At the Romagnano III site, all categories of Mesolithic finds more or less vary, which is normal. In the nearby site of Predestel, which has a Mesolithic layer almost 4 m thick, similar categories of comparable Mesolithic finds that have been ^{14}C dated to the same time interval, vary differently (Alessio 1983, 248) and so on.

If we wanted to obtain a more or less reliable development phase of the Mesolithic in a particular region, we would have to behave as I indicated in the case of Divje babe I (Turk 2003). We would thus need at least 20–30 similar sites as Romagnano III, which would also have to be sedimentologically processed suitably, which Romagnano III is certainly not. It would also be necessary to change a fair amount in the heads of those who are active in the field, since any kind of question starts to be resolved in the field and also ends there, if matters are not posed as the problem demands. Individuals already drew attention to this more than 30 years ago (Payne 1972 b), but this warning had little impact.

Despite the deficiencies of the Romagnano III reference site, there are (could be) the following differences in the inventory of Sauveterrian and Castelnovian layers:

- In the Castelnovian, there are more retouched blades than flakes (Broglio, Kozłowski 1983, Fig. 26), which can be connected with the increased production of blades (see Broglio 1984, 287)
- There are fewer segments, triangles, Sauveterrian points and large trapezes in the Castelnovian (ibid, Fig. 27). Microburins are connected with the making of trapezes. So their number should be greater in the Castelnovian, which is evident at the Gaban site (Kozłowski, Dalmeri 2000, Plate 11).
- There are fewer isosceles triangles in the Castelnovian (ibid, Fig. 32).

How do these differences appear at other sites from the same time, which have a profile composed of a number of layers? In the Gaban site, which is close to Romagnana III, the above statement indisputably applies only for the ratio of retouched blades/flakes and for trapezes, less for other microliths (Kozłowski, Dalmeri 2000, Plate 12–13). It would therefore be methodologically deficient if Mesolithic sites which have a limited number of layers, like Viktojev spodmol, were to be chronologically classified only on the basis of radiometry and similarities/differences with the Mesolithic inventory of sites such as Romagnano III and Gaban, without in a suitable way previously checking how reliable are the evolutionary phases in the 'reference' profile and thus indirectly also checking the radiometric dating.

10. Vprašanje izvora in nadaljevanja slovenskega mezolitika

10. The Question of Origin and Continuation of the Slovene Mesolitic

Ivan Turk

V Sloveniji ni nobenega najdišča, kjer bi bile v stratigrafskem zaporedju najdbe iz poznega paleolitika, ki ga v naši bližnji in daljni okolici predstavlja epigravetjen - (*epigravettien*), in (zgodnjega) mezolitika, ki ga predstavlja sovterjen - (*sauveterrien*). Prav tako ni najdišč, v katerih bi lahko našli lokalne razvojne faze gravetjena, sovterjena in kastelnovjena - (*castelnovien*), ker imajo vsa najdišča eno, največ dve arheološki plasti. Med njimi so samo redka kronometrično opredeljena (Ovčja jama, Lukenjska jama, Breg). Med posameznimi najdišči lahko pričakujem tudi velike časovne praznine. Vse to povzroča težave v kronologiji, ki je osnova za sklepanje o tem, kako je potekal razvoj. Dodatne težave povzročajo neustrezne terenske metode. Zato se lahko vprašam, ali je razprava o izvoru in nadaljevanju mezolitika v Sloveniji sploh smiselna. Smiselna je samo toliko, da z njo podam svoja teoretska izhodišča za bodoče delo.

V vprašanju razvoja bi se lahko naslonil na domneve italijanskih kolegov, vendar ne bi imel zagotovila, da je razvoj pri nas potekal podobno kot v severni Italiji.

Najbližje najdišče s stratificiranimi najdbami iz epigravetjena in mezolitika (sovterjena) je Pečina pri Bjarču v dolini Nadiže - *Riparo di Biarzo* (Guerreschi 1996). Plasti s paleolitskimi in mezolitskimi najdbami so debele približno 1 m. Končni epigravetjen Bjarča je kronološko določen z ^{14}C datacijo in s paleobotaničnimi podatki. A. Guerreschi je na podlagi primerjav z že opredeljenimi najdišči sovterjenske najdbe domnevno pripisal srednji fazi (italskega) sovterjena. Zanje so značilni redki segmenti in številni raznostranični trikotniki, podobno kot za kraška najdišča. Razmerje med segmenti in trikotniki je približno 1:5, v bolj oddaljenem Romagnanu III pa je to razmerje 1:2. Trapezov v Bjarču ni, so pa mikro vbadala. Vendar so trapezi prisotni v mlajših plasteh skupaj s keramiko.

Povezava italskega mezolitika s končnim epigravetjenom je precej močna pri nekaterih vrstah mikrolitskih orodij, ki vključujejo tudi geometrične oblike, pri mikrovbadalni tehniki in še kje. A. Guerreschi (1983) je zato zagovarjal domnevo o neposrednem izvoru mezolitika iz lokalnega končnega epigravetjena. A. Broglio (1984, 310) je bil v tem pogledu previdnejši, vendar takšne možnosti razvoja ni v celoti zavrnil.

Določene povezave lahko obstajajo tudi z neoliti-

There is no site in Slovenia in which finds from the late Paleolithic, which is represented in our near and distant surrounding by Epigravettian, and (early) Mesolithic represented by the Sauveterrian, are in stratigraphic sequence. Similarly there is no site in which one could find local development phases of the Gravettian, Sauveterrian and Castelnovian, because all sites have one or at most two archaeological layers. Only a few of them have been chronometrically defined (Ovčja jama, Lukenjska jama, Breg). Major chronological gaps can also be expected between individual sites. All this causes problems in chronology, which is the basis for concluding how development progressed. Inappropriate fieldwork methods also cause difficulties. I can therefore ask whether discussion on the origin and continuation of the Mesolithic in Slovenia makes any sense. It is only sensible insofar that I use it to provide my own theoretical starting points for future work.

In questions of development, I can rely on the conjectures of Italian colleagues, but I would have no assurance that development here took place similarly as in northern Italy.

The nearest site with stratified finds from the Epigravettian and Mesolithic (Sauveterrian) is Pečina pri Bjarču (*Riparo di Biarzo*) in the Nadiža valley (Guerreschi 1996). The layers with Palaeolithic and Mesolithic finds are approximately 1 m thick. The final Epigravettien in Bjarč is chronologically determined with ^{14}C dating and with palaeobotanical data. On the basis of comparison with already defined sites of Sauveterrian finds, A. Guerreschi putatively assigned the finds the middle phase of the ('Italic') Sauveterrian. It is characterised by occasional segments and numerous scalene triangles, similarly as for Karst sites. The ratio between segments and triangles is approximately 1:5, and in more distant Romagnanu III, this ratio is 1:2. There are no trapezes in Bjarč but there are microburins. However, there are trapezes present in later layers, together with pottery.

The link of the 'Italic' Mesolithic with the final Epigravettian is fairly strong with some types of microlithic tools, which also include geometric forms, with microburin technique and other things. A. Guerreschi (1983) therefore argued a presumption on the direct kom (Broglio 1984, 311), čeprav jih na podlagi novejše primerjalne analize kamenih artefaktov v italijanskih najdiščih naj ne bi bilo (Biagi *et al.* 1993, 58, 64). Nanje kažejo npr. trapezi, mikrovbadalna tehnika, ravne dolge kline in še kaj. Za zgodnji neolitik so ponekod značilni trapezi z ventralno ploskovno (paralelno) retušo ob krajši prečni retuši (Löhr 1994, 20 s). Takšnih trapezov ni niti v Viktorjevem spodmolu niti v M. Triglavci.

Pri slovenskih mezolitskih najdiščih je težko govoriti o izvoru in nadaljevanju mezolitika predvsem zaradi domnevno velikih časovnih vrzeli med najdišči, ki pripadajo poznemu paleolitiku, celotnemu mezolitiku in zgodnjemu neolitiku. Potem so tu že omenjene težave, povezane s terenskimi metodami in njihovo ustreznostjo, in skromna raziskanost večine najdišč, posledica česar je pomanjkanje podatkov, ki dopolnjujejo podobo najdišč in njihovega časa, vključno z radiometričnimi podatki. Domnevne povezave med poznim paleolitikom in mezolitikom je kljub vsemu smiselno iskati predvsem pri dveh paleolitskih najdiščih: Ciganski jami in Poljšiški cerkvi. M. Brodar (1991, 38) je uvrstil Cigansko jamo v gravetjen, ne čisto na konec poledenitve, Poljšiško cerkev pa v pozni paleolitik nekje proti koncu poznega glaciala (Brodar 1995, 13, 16).

Glavno vez med našim epigravetjenom in mezolitikom predstavljata mikrolitizacija orodij in strma retuša (hrbet), vključno s t. i. "gravetjensko ali gravetno retušo", ki ima svoje nadaljevanje v mezolitiku. Zato sama mikrolitska orodja, opremljena s takšno retušo, niso zanesljiv kronološki kazalec. V podrobnejši primerjavi moram, žal zaradi neustreznih terenskih metod po mojem kriteriju postaviti v drugi plan mikrolite in hipermikrolite in se osredotočiti na orodja, ki merijo v dolžino in širino vsaj 10 mm.

Domnevno obstaja več povezovalnih oblik, ki se bodo dale v bodoče potrditi in razvrstiti glede na pomembnost (sl. 10.1).

Kot prvo omenjam **praskala posebnih oblik** (nohtasta, krožna), izdelana na kratkih nastavkih.

Potem so tu **konice s poševno prečno retušo**, ki veljajo drugje za zelo mlado paleolitsko pridobitev. Močno razširjene naj bi bile šele v mlajši dobi drijasa (*dryas*), prav na koncu paleolitika (G.E.E.M. 1972, 367). Podobne konice so bile najdene v Ciganski jami (Brodar 1991, t. 19: 16, 21; 20: 15). M. Brodar (1991, 37) jih je označil kot gravetirano orodje, ki nima ravnega, ampak konveksno usločen hrbet, ki se konča s konico. Zato predlaga zanje poimenovanje upognjena konica. Vendar M. Brodar te konice ne omenja v povezavi z "znanilci prihodnjega kulturnega razvoja", s čimer misli različne mezolitske komplekse (prav tam). Konice s poševno prečno retušo, predvsem kratke, so zastopane tudi v inventarju Poljšiške cerkve (Brodar 1995, t. 2; 365; 5: 434 in 465). M. Brodar (1995, 14) jih je označil kot "primerke z gravetno retušo", medtem ko celoten značaj najdb po njegovem odstopa od gravetjena. V naših mezolitskih naj-

origin of the Mesolithic from the local final Epigravettian. A. Broglio (1984, 310) was more cautious from that point of view, although he did not entirely reject such a possibility of development.

There could also be specific links with the Neolithic (Broglio 1984, 311), although on the basis of more recent analyses of stone artefacts in Italian sites, such is not thought to be the case (Biagi et al. 1993, 58, 64). It is indicated by, for example, trapezes, microburin technique, straight, long blades and other things. The early Neolithic is characterised in places by trapezes with ventral parallel retouch together with short truncation (Löhr 1994, 20 s). There are no such trapezes in either Viktorjev spodmol or M. Triglavca.

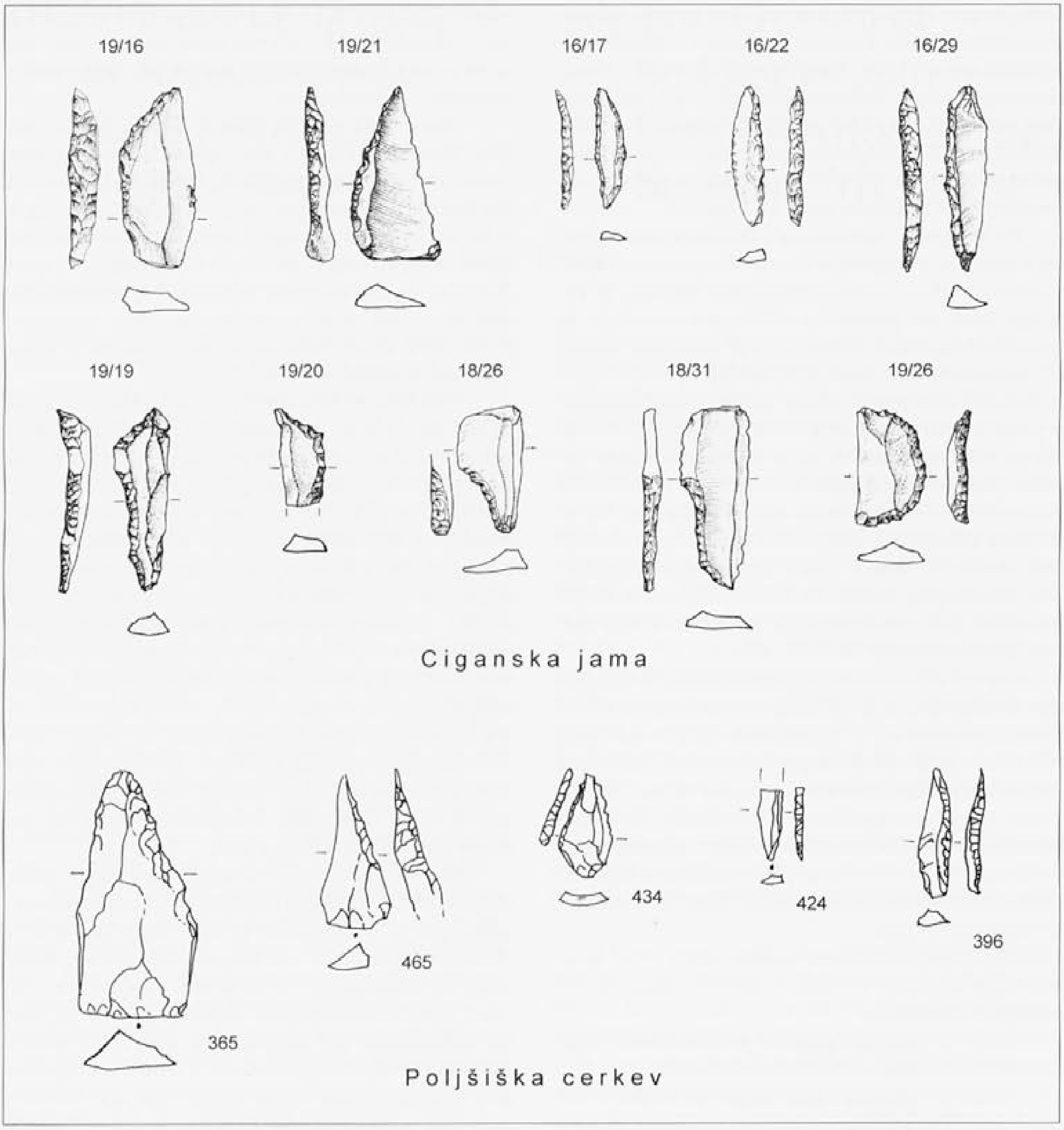
With Slovene Mesolithic sites, it is difficult to speak of the origin and continuation of the Mesolithic, mainly because of the suspected large time gaps between sites belonging to the Late Palaeolithic, the entire Mesolithic and the Early Neolithic. There are then the already mentioned difficulties connected with fieldwork methods and their suitability, and the modest investigation of the majority of sites, a consequence of which is a lack of data, including radiometric data, which supplement image of the sites and their times. Suspected links between the Late Palaeolithic and Mesolithic can nevertheless be sensibly sought mainly at two Palaeolithic sites: Ciganska jama and Poljšiška cerkev. M. Brodar (1991, 38) classified Ciganska jama into the Gravettian, not quite at the end of the Last Glacial, and Poljšiška cerkev into the Late Palaeolithic, somewhere towards the end of the Late Glacial (Brodar 1995, 13, 16).

Microlithisation of tools and backed pieces, including so-called "gravettian or gravette (crossed) retouch", which has its continuation in the Mesolithic, provide the main link between our Epigravettian and the Mesolithic. So microlithic tools fitted with such a retouch are not a reliable chronological indicator. In a more detailed comparison, unfortunately because of unsuitable fieldwork methods by my criteria, I must put microliths and hypermicroliths in the background and focus on tools that measure at least 10 mm in length and width.

Presumably a number of linking forms exist that will in the future allow confirmation and classification in relation to importance (Fig. 10.1)

First of all, I cite **endscrapers of special shapes** (e.g. ungiform, circular), made on short blanks.

Then there are **points with oblique truncation**, which are considered elsewhere to be a very late Palaeolithic advance. They are only thought to be widespread in the younger Dryas period at the end of the Palaeolithic (G.E.E.M. 1972, 367). Similar points were found in Ciganska jama (Brodar 1991, Plates 19: 16, 21; 20: 15). M. Brodar (1991, 37) characterised them as Gravettian tools which do not have a straight but convex back ending in a point. He therefore proposes calling it a curved point. However, M. Brodar does not mention these points in



Sl. 10.1: "Protomezolitske" oblike orodij v slovenskih poznopaleolitskih najdiščih. Risbe in oznake risb po M. Brodarju (1991 in 1995).

Fig. 10.1: "Protomesolithic" forms of tools in Slovene Late Palaeolithic sites. Drawings and signs on drawings according to M. Brodar (1991 and 1995).

diščih je takšna konica precej redka. Po en primerek je morda znan v previsu Pod Črmukljo (Brodar 1992, t. 4: 23) in na Bregu (Frelih 1986, t. 2: 11). Nekoliko spremenjena sta dva analogna primerka z Brega (prav tam, t. 3: 6, 15).

Tretja povezovalna oblika je (mikrolitska) **konica z ravnim hrbtom** (G.E.E.M. 1972, 367, sl.3), ki je v bistvu popolnoma enaka kot gravetjenska konica. To pomeni, da ima lahko tudi gravetjensko retušo. Zato je M. Brodar (1992, 26) šest mikrolitov iz najdišča Pod Črmukljo

connection with "characterisers of future cultural development" by which he is thinking of various Mesolithic complexes (ibid). Points with an oblique truncation, mainly short, are also represented in the inventory of Poljšiška cerkev (Brodar 1995, Plates 2: 365; 5: 434 and 465). M. Brodar (1995, 14) characterised them as "specimens with a gravette retouch", while the overall character of finds in his opinion deviates from the Gravettian. Such a point is fairly rare in our Mesolithic sites. There is perhaps one specimen each known from the uvrstil med gravetirane klinice, pri čemer dopušča možnost, da gre pri enem ali dveh primerkih za fragment trikotnika. V Ciganski jami so konice z ravnim hrbtom (gravetjenske) relativno pogoste (Brodar 1991, 36). V Poljšiški cerkvi je ena sama (Brodar 1995, t. 5: 424), ki jo je M. Brodar (1995, 14) opredelil kot nožiček s hrbtom. Pod Črmukljo ni bila najdena nobena mikrolitska konica. V Viktorjevem spodmolu in M. Triglavci mikrolitske konice sicer so, vendar med njimi ni konic z ravnim hrbtom. Vse konice imajo namreč dvojen hrbet. Pri tem je zanimivo, da je bil en medialni odlomek mikrolita z dvojnim hrbtom (inv. št. 837) najden tudi v zgornji gravetjenski plasti v Ciganski jami (Brodar 1991, t. 18: 17). M. Brodar ga posebej ne obravnava, saj ga je pripisal skupini nožičkov s topim hrbtom (Brodar 1991, 36). V Ciganski jami prevladujejo relativno veliki mikroliti. Majhni so redki, vendar dajo slutiti, da je bila mikrolitizacija celo večja od ugotovljene. Spiranje deponiranih sedimentov Brodarjevih izkopavanj bi nedvomno obogatilo naše védenje o vlogi mikrolitov in morebitnih hipermikrolitov v tem ključnem najdišču.

Četrta povezovalna oblika je **čolničasta konica** (G.E.E.M. 1972, 367 ss, sl. 4). V Ciganski jami je možnih kar nekaj primerkov (Brodar 1991, t. 16: 17, 22, 29). V Poljšiški cerkvi je en sam primerek, ki ga je M. Brodar (1995, t. 2: 396) opredelil za koničasto klinico. Redki takšni primerki so bili najdeni tudi v Viktorjevem spodmolu in M. Triglavci.

Peta povezovalna oblika je **klinica s hrbtom in prečno retušo**. To geometrijsko orodje prištevam med raznostranične trikotnike, da se izognem težavam pri razlikovanju med pravimi trikotniki ter klinicami s hrbti in prečno retušo. Dve klinici s hrbtom in prečno retušo sta bili najdeni v Ciganski jami (Brodar 1991, t. 19: 19-20). M. Brodar (1991, 37) je eno umestil med izrobljene kose, o drugi (inv. št. 574) pa pravi, da je blizu iztegnjenega trikotnika in da je 'znanilec prihodnjega kulturnega razvoja', tako kot segment (inv. št. 1460) in primerek, ki 'spominja na konico tardenois' (Brodar 1991, 37, t. 19: 17, 26). Mislim, da slednji primerek niti malo ne spominja na tardenojsko konico, saj mu manjkajo vsi za to konico značilni elementi (glej Rozoy 1978, 233; G.E.E.M. 1972, 370 ss). V Poljšiški cerkvi ni nobene klinice s hrbtom in prečno retušo, kar je glede na časovno umestitev najdišča precej nenavadno. So pa takšni primerki relativno pogosti Pod Črmukljo (Brodar 1992, t. 5: 27-28, 30-31, 33-34, 37-38, 43) in predvsem v Viktorjevem spodmolu in v M. Triglavci (t. 8: 7-11, 18-20; 9: 21-22, 27-30 idr.), kjer so, kot rečeno, umeščeni v skupino raznostraničnih trikotnikov. Sedanja podoba Viktorjevega spodmola in M. Triglavce je odsev terenske metode, saj so se klinice s hrbti in prečno retušo od paleolitika do mezolitika izrazito pomanjšale (mikrolitizirale), tako da lahko v posamičnih primerih govorimo o mezolitskih hipermikrolitih.

V vprašanju mikrolitizacije v slovenskih najdiščih

overhang cave of Pod Črmukljo (Brodar 1992, Plate 4: 23) and in Breg (Frelih 1986, Plate 2: 11). Two analogous specimens from Breg are slightly altered (ibid, Plate 3: 6, 15).

The third linking form is a (microlithic) **point with a straight back** (G.E.E.M. 1972, 367, Fig.3), which is in essence entirely the same as a gravette point. This means that it can also have a gravette retouch. So M. Brodar (1992, 26) classified six microliths from Pod Črmukljo among gravette bladelets, in which he allowed the possibility that one or two specimens were actually fragments of triangles. In Ciganska jama, points with straight backs (gravettian point) are relatively common (Brodar 1991, 36). In Poljšiška cerkev there is only one (Brodar 1995,Plate 5: 424), which M. Brodar (1995, 14) defined as a backed bladelet. No microlithic points were found in Pod Črmukljo. Although there are microlithic points in Viktorjev spodmol and M. Triglavca, none of them are points with a straight back. All the points, in fact, are double backed. It is interesting in this that one medial fragment of a microlith with a double back (inv. no. 837) was also found in the upper Gravettian layer in Ciganska jama (Brodar 1991, Plate 18: 17). M. Brodar does not deal with it individually, since he ascribed it to the group of bladelets with semi-abrupt retouch (Brodar 1991, 36). In Ciganska jama, relatively large microliths predominate. There are a few small ones, and they give rise to the suspicion that microlithisation was even further advanced than has been established. Wet sieving deposited sediments of Brodar's excavation would undoubtedly enrich our knowledge of the role of microliths and possible hypermicroliths at this key site.

The fourth linking form is a **navicular point** (G.E.E.M. 1972, 367 ss, sl. 4). There are several possible specimens in Ciganska jama (Brodar 1991, Plate 16: 17, 22, 29). In Poljšiška cerkev there is only one specimen, which M. Brodar (1995, Plate 2: 396) classified as a pointed bladelet. Occasional such specimens were also found in Viktorjev spodmol and M. Triglavca.

The fifth linking form is a **backed and truncated bladelet**. I include this geometric tool among scalene triangles in order to avoid difficulties in distinguishing between real triangles and backed and truncated bladelets. Two backed and truncated bladelets were found in Ciganska jama (Brodar 1991, Plate 19: 19-20). M. Brodar (1991, 37) placed one among shouldered pieces, and says about the other (inv. no. 574) that it is close to an extenuated triangle and that it is 'a harbinger of future cultural development', just as a segment (inv. no. 1460) and a specimen that is 'reminiscent of a Tardenoid point', (Brodar 1991, 37, Plate 19: 17, 26). I think that the last example is in no sense reminiscent of a Tardenoid point, since all the characteristic elements of such a point are missing (see Rozoy 1978, 233; G.E.E.M. 1972, 370 ss). No backed and truncated bladelets were found in Poljšiška cerkev, which is very surprising considering the

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se ne strinjam z razmišlanjem M. Brodarja (1995, 16), ki ni upošteval vpliva terenske metode na ugotovljeno stopnjo mikrolitizacije.

Šesta povezovalna oblika so **izrobljene kline**. Te so pogoste v Ciganski jami (Brodar 1991, 38, t. 18: 26-35), manj pogoste v Poljšiški cerkvi (Brodar 1995, 15, t. 6: 18, 156) in Pod Črmukljo (Brodar 1992, 26, t. 5: 9, 12). V Viktorjevem spodmolu jih ni, razen na mikrolitskih armaturah, so pa prisotne v M. Triglavci (t. 18: 181, 183-184).

Kot zadnjo povezovalno obliko moram ponovno omeniti **krožne segmente**, ki pa so, kot trenutno kaže, v Sloveniji zelo redki tako v poznem paleolitiku (Brodar 1991, t. 19: 26) kot v celotnem znanem mezolitiku (Frelih 1986, t. 5:1-4; Brodar 1995, t. 2: 163, 5: 470). Zmanjševanje deleža krožnih segmentov je sicer značilno za mlajše faze italskega mezolitika (Broglio, Kozłowski 1983), vendar mislim, da v Sloveniji in naTržaškem krasu to ni povezano s časom, temveč gre prej za značilnost tega prostora. Krožni segmenti se tu enostavno niso prijeli.

time setting. However, such specimens are fairly common in Pod Črmukljo (Brodar 1992, Plate 5: 27-28, 30-31, 33-34, 37-38, 43) and above all in Viktorjev spodmol and in M. Triglavca (Plates 8: 7-11, 18-20; 9: 21-22, 27-30 etc.), where, as has been said, they are placed in the group of scalene triangles. The present appearance of Viktorjev spodmol and M. Triglavca is a reflection of the fieldwork method, since backed and truncated bladelets became significantly smaller from the Palaeolithic to the Mesolithic (microlithisation) so that in certain cases we can talk about Mesolithic hypermicroliths.

On the question of microlithisation at Slovene sites, I do not agree with the thinking of M. Brodar (1995, 16), which does not take into account the influence of fieldwork method in establishing the level of microlithisation.

Shouldered blades are the sixth linking form. These are frequent in Ciganska jama (Brodar 1991, 38, Plate 18: 26-35), less frequent in Poljšiška cerkev (Brodar 1995, 15, Plate 6: 18, 156) and Pod Črmukljo (Brodar 1992, 26, Plate 5: 9, 12). There are none in Viktorjev spodmol, except microlithic armatures, but they are present in M. Triglavca (Plate 18: 181, 183-184).

As the last linking form, I must again mention **circular segments**, which at the moment appear to very rare both in the Late Palaeolithic (Brodar 1991, Plate 19: 26) and in the entire known Mesolithic (Frelih 1986, Plate 5:1-4; Brodar 1995, Plates 2: 163, 5: 470). A reduction of the share of circular segments is however characteristic of the later phases of the Italic Mesolithic (Broglio, Kozłowski 1983), but I think that in Slovenia and on the Triestine Karst this is not connected with time but is rather a characteristic of this region. Circular segments simply did not take hold here.

11. Najdbe kreamike

11. Finds of Pottery

Ivan Turk & Anton Velušček

Najdbe keramike sicer ne sodijo v mezolitik, ki je predmet te knjige, vendar vseeno zaslužijo nekaj stavkov.

Dejstvo je, da je bilo najdišče občasno poseljeno ali vsaj obiskano tudi v pomezolitskem obdobju. Iz razpredelnice 6.3.1 je razvidno, da se keramične najdbe gostijo v zgornjem delu plasti 2. Plast 3 (mezolitik) je popolnoma brez ostankov keramike.

Količina najdene keramike je majhna (145 kosov ali 1,5 kg, vse manjši fragmenti). Skoraj vsa keramika je nedvomno prazgodovinska. Podrobneje kronološko-tipološko se ne da opredeliti, čeprav sva ugotovila nekatere elemente kaštelirske keramike. Takšna keramika je glede na bližino kaštelirja pričakovana (glej Novaković, Turk 1991). Nekaj kosov keramike ni prazgodovinskih. En fragment pološčene novodobne ali antične keramike je bil najden v režnju 7, kar kaže na določeno mešanje najdb iz različnih obdobij.

Arheološka stratigrafija je tako lahko nadvse podobna tisti z najdišča Pod Črmukljo (Brodar 1992, 25).

The finds of pottery do not belong to the Mesolithic, which is the subject of this book, but they nevertheless deserve a few sentences.

The fact is that the site was occasionally settled or at least visited also in the post-Mesolithic period. It is clear from Table 6.3.1 that the pottery finds are denser in the upper part of layer 2. Layer 3 (Mesolithic) is completely without remains of pottery.

The amount of pottery found is small (145 pieces or 1.5 kg, all smaller fragments). Almost all the pottery is undoubtedly prehistoric. It cannot be defined in more detail chronologically-typologically, although we identified some fragments of Iron Age *castellieri* pottery. In view of the proximity of settlement from this period, such pottery is to be expected (see Novaković, Turk 1991). Some pieces of pottery are not pre-historic. One fragment of glazed new era or Roman pottery was found in spit 7, which indicates a certain mixing of finds from various periods.

Archaeological stratigraphy may be thus above all similar to that at the Pod Črmukljo site (Brodar 1992, 25).

12. Makroskopski rastlinski ostanki – semena in oglje

12. Plant Macro-remains – Seeds and Charcoal

Metka Culiberg

V analizo smo sprva dobili makroskopske rastlinske ostanke, ki so bili poleg arheološkega in kostnega materiala zbrani iz nestratificiranega sedimenta sonde Viktorjevega spodmola (faza Viktor in IzA). Rezultati analiz so navedeni ločeno v razpredelnici 12.1, kjer sta podana le seznam in število vseh ugotovljenih vrst semen ter seznam z antrakotomsko analizo ugotovljenih drevesnih vrst in številom analiziranih primerkov oglja. Ponovno sondiranje profila iz Viktorjevega spodmola, ki sta ga izvedla J. Dirjec in I. Turk (faza IzA), je bilo izpeljano stratigrafsko po režnjih, debelih 5 cm. Poleg večjega števila koščic, pešk, oreškov in zrn različnih plodov, smo v sedimentu našli tudi precej manjših koščkov lesnega oglja. V razpredelnici 12.2 so navedeni rezultati analiziranih rastlinskih ostankov po posameznih režnjih. Pri identifikaciji semen oziroma lesnega oglja smo uporabljali določevalne ključe po Bertschu (1941), Katzu *et al.* (1965), Schweingruberju (1978) in zbirko recentnih semen in recentnega oglja Biološkega inštituta Jovana Hadžija.

12.1 Semena in plodovi

Prevladujejo koščice t. i. koščičastih plodov, za katere je značilno, da imajo zunanji del sočen, omesenel, osrednji del pa je trda koščica, ki se v ugodnih edafskih razmerah lahko dalj časa ohrani tudi nezoglenela. Take plodove imajo rumeni dren (*Cornus mas* L.), rdeči dren (*Cornus sanguinea* L.), češnja (*Prunus avium* L.) in sliva (*Prunus domestica* L.). Tudi plod robide (*Rubus fruticosus* L.) sodi med koščičaste plodove, le da so pri njem številni majhni koščičasti plodiči zrasli v t. i. birni plod. Navidezno podobni, morfološko pa drugačni plodovi so jagode vinske trte (*Vitis vinifera* L.) in črnega bezga (*Sambucus nigra* L.). Tudi jagode imajo omesenelo oplodje v katerem pa je navadno več semen. Poleg naštetih semen večinoma užitnih plodov so bili med najdbami še plodiči javorja (*Acer* sp. L.), vendar brez krilc, in semena robinije (*Robinia pseudoacacia* L.), ki so se iztresla iz strokov.

We first obtained for analysis macroscopic plant remains that had been collected together with archaeological and bone material from unstratified sediment of the test trench of Viktorjev spodmol (Viktor and IzA phase). The results of analysis are given separately in Table 12.1, in which only a list and the number of all identified species of seed are given, a list with tree species identified by anthracotomic analysis and numbers of analysed specimens of charcoal. A new investigation of a profile of Viktorjev spodmol, which was done by J. Dirjec and I. Turk (IzA phase), was carried out stratigraphically by spits 5 cm thick. In addition to a large number of small bones, pips, nuts and seeds of various fruits, we also found in the sediment a fair number of small pieces of wood charcoal. Table 12.2 gives the results of the analysed plant remains by individual spits. In the identification of seeds or wood charcoal, we used the identification key according to Bertsch (1941), Katz et al. (1965), Schweingruber (1978) and the collection of recent seeds and recent charcoal of the Jovan Hadži Biological Institute.

12.1 Seeds and fruits

Stones of so-called stone fruits predominated, which are characterised by the outer parts being soft, pulpy, and the central part being a hard stone which, under favourable edaphic conditions, can also be preserved uncarbonised for extended periods. Cornelian cherry (*Cornus mas* L.), dogwood (*Cornus sanguinea* L.), cherry (*Prunus avium* L.) and plum (*Prunus domestica* L.) have such seeds. The fruit of blackberry (*Rubus fruticosus* L.) also belongs among stone fruits, except that in its case, numerous small stone fruits grow into a aggregate fruit. The berries of grape (*Vitis vinifera*) and elder (*Sambucus nigra* L.) are apparently similar, but morphologically different fruits. Berries, too, have a pulpy fruit in which there are normally a number of seeds. In addition to the aforementioned seeds of mainly edible fruits, among the finds were the seeds of maple (*Acer* sp. L.), but without the wings, and even the seeds of false acacia (*Robinia pseudoacacia* L.), which had been shaken from the pods.

Razpredelnica 12.1: Viktorjev spodmol, rastlinski ostanki iz nestratificiranega sedimenta sonde (faza Viktor in IzA).
Table 12.1: Viktorjev spodmol, plant remains from unstratified sediments of the test trench (Viktor and Viktor and IzA phases).

Semena **Seeds**	**Oglje** **Charcoal**
Cornus mas *Cornus sanguinea* *Sambucus nigra* 74 *Rubus fruticosus* 13 *Robinia pseudoacacia* 24	*Pinus* sp. 1 *Carpinus* sp. 3 *Fraxinus* sp. 6 *Quercus* sp. 3 *Tilia* sp. 1 *Populus* sp. 1 listavec / caducifol. indet. 21 iglavec / conif. indet. 3

12.2 Charcoal

The specimens of charcoal were for the most part small, from 0.5 to 1 cm and even smaller. Seventy specimens were examined. The largest shares of all the analysed pieces of charcoal have the anatomic characteristics of manna ash (*Fraxinus ornus* L.), maple (*Acer* sp.) and oak (*Quercus* sp.). Pine (*Pinus* sp.), hornbeam (*Carpinus* sp.), hop hornbeam (*Ostrya carpinifolia* Scop.) were also represented, and there was one specimen each of charcoal with the characteristics of the wood of lime (*Tilia* sp.), poplar (*Populus* sp.) and spruce (*Picea* sp.). Some specimens had a strongly damaged internal structure, so that it was not possible to identify a distinct tree species.

Razpredelnica 12.2: Viktorjev spodmol, stratigrafsko opredeljene najdbe rastlinskih ostankov (faza IzA).
Table 12.2: Viktorjev spodmol, stratigraphically defined finds of plant remains (IzA phase).

Reženj / Spit	**Semena / Seeds**	**Oglje / Charcoal**
2	*Cornus mas* 40 + 17 poškodovanih / damaged *Cornus sanguinea* 8 + ½ *Prunus avium* 2 *Prunus domestica* 2 *Robinia pseudoacacia* 9 *Acer (campestre)* 13	
3	*Cornus mas* 48 *Cornus sanguinea* 6 + ½ *Prunus domestica* 2 + ½ *Vitis vinifera* 4 *Acer* 2 ½ *Robinia pseudoacacia* 8	*Acer* 2
4	*Cornus mas* 18 *Cornus sanguinea* 3 *Vitis vinifera* 2 *Acer* 3	*Ostrya carpinifolia* 1 *Fraxinus ornus* 1
5	*Cornus mas* 5 *Cornus sanguinea* ½ *Vitis vinifera* 1 *Robinia pseudoacacia* 3	*Fraxinus* 2 *Pinus* 1 Kalcificirano lesno oglje / Calcinated charcoal – nedoločljivo / unidentifiable 1
6	*Cornus mas* ½ *Cornus sanguinea* 1 *Prunus avium* 1 *Vitis vinifera* 1 *Robinia pseudoacacia* 3	*Ostrya carpinifilia* 1 *Quercus* 2 *Fraxinus ornus* 2
7	*Cornus mas* 3 + fragm. *Acer* 1 *Robinia pseudoacacia* 2	*Acer* 3 *Quercus* 1 *Fraxinus* 1 *Picea* 1 *Pinus* 2
8	*Cornus mas* 2 *Robinia pseudoacacia* 1	*Acer* 1
9	*Cornus mas* 19 *Cornus sanguinea* 1 *Robinia pseudoacacia* 1	*Fraxinus* 1
10		*Carpinus* 1
11		*Quercus* 2 *Fraxinus* 2
12		*Quercus* 1
14		*Acer* 3 *Pinus* 1
15	*Cornus mas* 1	listavec / caducifol. indet. 1
16	*Quercus* sp.	

12.2 Oglje

Primerki oglja so večinoma manjše velikosti, od 0,5 do 1 cm in celo še manjši. Pregledanih je bilo 70 vzorcev. Največji delež od vseh analiziranih koščkov oglja ima anatomske značilnosti malega jesena (*Fraxinus ornus* L.), javorja (*Acer* sp. L.) in hrasta (*Quercus* sp. L.). Zastopani so še bor (*Pinus* sp. L.), gaber (*Carpinus* sp. L), črni gaber (*Ostrya carpinifolia* Scop.), po en primerek oglja pa ima lastnosti lesa lipe (*Tilia* sp. L.), topola (*Populus* sp. L.) in smreke (*Picea* sp. A. Dietr.), nekaj pa jih je imelo tako močno poškodovano notranjo strukturo, da jim ni bilo mogoče določiti pripadnosti drevesni vrsti.

12.3 Razprava in sklepi

Semena, zbrana iz sedimenta v Viktorjevem spodmolu, so po našem mnenju recentna oziroma subrecentna. Vsa brez izjeme so namreč nepooglenela. Na takšno opredelitev pa je še močneje vplivala njihova vrstna sestava. Koščice plodov in druga semena se v posebnih talnih razmerah res lahko ohranijo zelo dolgo, tudi če so nezoglenela, kar potrjujejo podobne najdbe iz eneolitskih koliščarskih najdišč na Ljubljanskem barju. Koščice drnulj, plodov rumenega drena (*Cornus mas* L.), robide in maline (*Rubus fruticosus* L., *Rubus idaeus* L.) ter peške vinske trte (*Vitis vinifera* L.), so se tam ohranile več tisoč let (Culiberg, Šercelj 1980, Jeraj 2002). Toda ta semena so bila ugotovljena le v arheoloških plasteh in tako že bolj ali manj kronološko opredeljena. Iz razpredelnice 12.2 pa je razvidno, da je koncentracija semen v profilu v Viktorjevem spodmolu največja prav v zgornjih režnjih, v globino pa upada. Tako je tudi s koščicami drnulj, ki jih je med vsemi semeni največ, saj jih najdemo v vseh stratumih skupaj z drugimi semeni. Da smo rastlinske ostanke opredelili za recentne oziroma subrecentne, je v veliki meri odločalo tudi seme robinije (*Robinia pseudoacacia* L.), ki je pri nas sicer že zelo razširjena drevesna vrsta, vemo pa, da so jo v Evropo prinesli iz Severne Amerike šele v začetku 17. stoletja. In prav seme robinije je ugotovljeno tudi v devetem režnju. Tam se najdbe semen tudi nehajo in potemtakem ne morejo biti starejše od 300 do 400 let. Izjemi sta bili le še ena koščica drena v petnajstem režnju in zelo majhen, nedozorel hrastov želod (*Quercus* sp.) v šestnajstem režnju. Večina drevesnih in grmovnih vrst, katerih semena so bila ugotovljena, uspeva v gozdu, ob robu gozda ali na odprtih površinah bližnje okolice najdišča. Tudi semena sadežev gojenih vrst (sliva, vinska trta) zaradi bližine naselij niso nič nenavadnega. Najverjetneje je, da so bili ti sadeži hrana raznih živali, ki so jih tudi zanesle do najdišča in najbrž tudi v nižje plasti sedimenta, plodove javorja in robinije pa je lahko prinesel veter.

Iz nestratificiranega sedimenta sonde Viktorjevega spodmola (razpredelnica 12.1) so bile po mokrem

12.3 Discussion and conclusions

The seeds collected from the sediment in Viktorjev spodmol are in our opinion recent or sub-recent. All, without exception, namely are uncarbonised. The species composition further strongly influenced such a conclusion. In particular soil conditions, the stones of fruit and other seeds can in fact be preserved very long, even if they are not carbonised, as is confirmed by similar finds from Eneolithic pile-dweller sites on the Ljubljana barje (Ljubljana moor). Stones of cornelian cherry (*Cornus mas* L.), blackberry and raspberry (*Rubus fruticosus* L., *Rubus idaeus* L.) and the pips of grape (*Vitis vinifera*), have been preserved there for several thousand years (Culiberg, Šercelj 1980, Jeraj 2002). However, these seeds were only found in archaeological layers and so more or less chronologically defined. It is evident from Table 12.2 that the concentration of seeds in the profile of Viktorjev spodmol is the highest precisely in the upper cuts and it decreases with depth. It is also the same with the fruit stones of dogwood, of which there are the most of all the seeds, since they are found in all strata, together with other seeds. The reason that we identified the plant remains as recent or sub-recent was also the large number of seeds of false acacia (*Robinia pseudoacacia* L.), which is a very widespread tree species here but we know it was only brought from North America at the beginning of the 17th century. The seeds of *Robinia* were found in the ninth spit, as well. Seeds also stop there, and accordingly they cannot be older than 300 to 400 years. There were only two exceptions, the stone of a cherry in the fifteenth spit and a very small unripe oak acorn (*Quercus*) in the sixteenth spit. The majority of the tree and shrub species whose seeds were identified thrive in forest, at forest margins or in open spaces in the vicinity of the site. Even the seeds of cultivated fruit species (plum, grape), because of the proximity of settlements, are in no way unusual. It is very probable that the fruits were food for various animals, which brought them to the site and probably also to the lower layers of the sediment, and the seeds of maple and false acacia could have been carried by the wind.

From the unstratified sediment of the test trench of Viktorjev spodmol (Table 12.1) the fruit stones of blackberry (*Rubus fruticosus* L.) and elder (*Sambucus nigra* L.) were additionally found after wet sieving, while with the later stratigraphic excavations not a single specimen of either species was found. It may have been that these seeds were carried into the sediment or even only onto the surface of the sediment later, even after the excavations, perhaps with bird excrement.

The wood charcoal was diffusely spread throughout the sediment. According to the anatomical characteristics, we determined for each specimen the affiliation of the tree species and identified a relatively large variety of species. However, all the species that we found also izpiranju najdene še koščice plodov robide (*Rubus fruticosus* L.) in črnega bezga (*Sambucus nigra* L.), medtem ko pri poznejših stratigrafskih izkopavanjih ni bil ugotovljen niti en primerek ene ali druge vrste. Lahko da so ta semena prišla v sediment ali celo le na površino sedimenta še pozneje, celo že po izkopu, morda s ptičjimi iztrebki.

Lesno oglje je bilo difuzno razpršeno po sedimentu. Po anatomskih značilnostih smo vsakemu vzorcu določili pripadnost drevesni vrsti in ugotovili relativno veliko pestrost vrst. Vendar vse vrste, ki smo jih ugotovili, tudi danes sestavljajo gozdove tega območja, prav tako pa so lahko tu uspevali tudi v bližnji in celo daljni preteklosti, celo že v mezolitiku. V stratificiranih režnjih profila ni zaznati posebno razločne sukcesije v razvoju gozdne vegetacije, gotovo pa je v tako dolgem obdobju bila prisotna.

Hrast (*Quercus*) in jesen (*Fraxinus*) ter javor (*Acer*), ki prevladujejo od 11. do 15. režnja morda kažejo tudi na fazo nekoliko okrnjenega primarnega mešanega hrastovega gozda (Quercetum mixtum), v katerem je bil še bor (*Pinus*) (Šercelj 1996). Takšno vegetacijo bi kronološko lahko postavili v začetek atlantika, kar bi ustrazalo mlajšemu mezolitiku, vsekakor pa bi za nadaljnjo diskusijo bile potrebne ^{14}C datacije oglja zlasti iz teh, kot tudi iz drugih režnjev.

V zgornjih plasteh se vsebinska sestava oglja bistveno ni spremenila, vse te vrste so še vedno zastopane, le da se jim od 6. režnja navzgor pridruži še črni gaber (*Ostrya carpinifolia*), ki je značilen za močno presvetljene degradirane gozdove zaraščajočih se pašnikov. Zanimivo je tudi, da med najdenim ogljem ni bilo nobenega primerka bukve (*Fagus* L.), saj bi to pričakovali vsaj v starejših plasteh.

Tudi v primeru, da oglje ni bilo presedimentirano, bi zaradi majhnega števila vzorcev težko govorili o tipskih gozdnih združbah oziroma njihovih sukcesijah, in še teže bi jih časovno opredelili brez radiokarbonske datacije in arheoloških najdb.

compose the forests of this region today, and they could similarly have thrived here in the near and even distant past, even in the Mesolithic. In the stratified spits of the profile there is no particularly marked distinguishing succession in the development of forest vegetation, though certainly it was present over such a long period.

Oak (*Quercus*) and ash (*Fraxinus*) and maple (*Acer*), which predominate from the 11th to the 15th spits perhaps also indicate a phase of somehow degraded primary mixed oak forest (Quercetum mixtum), in which there was also pine (*Pinus*) (Šercelj 1996). Such anthropozoically induced vegetation could be placed chronologically at the beginning of the Atlantic period, which would correspond to the Late Mesolithic, but certainly ^{14}C dating of the charcoal, especially from these but also from other spits, would be required for further discussion.

In the upper layers, the content composition of the charcoal did not essentially change. All these species are still represented, except that from the 6th spit upwards they are joined by hop hornbeam (*Ostrya carpinifolia*), which is characteristic of over-lighted degraded forest of overgrowing pastures. It is also interesting that among the charcoal found there was no specimen of beech (*Fagus*), which one would have expected, especially in the older layers.

Even in the case of the charcoal not having been re-deposited, because of the small number of specimens it would be difficult to reach any conclusions about types of forest associations or their successions, and still more difficult to define them chronologically without radiocarbon dating.

13. Holocenski kopenski in sladkovodni polži (Gastropoda) v Viktorjevem spodmolu

13. Holocene Land and Freshwater Molluscs (Gastropoda) in Viktorjev Spodmol

Rajko Slapnik

Viktorjev spodmol se nahaja v vznožju Vremščice (1027 m) v dolini reke Reke na robu Parka Škocjanske jame. Izoblikoval se je v plastnatih rudistnih apnencih. Spodmol je ostanek porušenega jamskega sistema reke Reke. Odpira se proti J-JV in je večji del dneva lepo osončen, hkrati pa dobro zavarovan pred burjo.

Polži se pogosto zatekajo v vhodne dele jam in spodmolov, kjer je zračna vlažnost relativno visoka. V večjem številu se zadržujejo na stenah, kjer jih veliko tudi pogine (Girod 2001). Prazne hišice padejo na tla in nekatere med njimi ostanejo nepoškodovane in lepo ohranjene v plasteh.

Ločevanje in zbiranje malakološkega materiala iz presejanih in posušenih vzorcev je bilo tokrat pri tovrstnih raziskavah v Sloveniji prvič natančno izvedeno. Z uporabo lupe z enkratno povečavo so bili odbrani vsi še tako majhni delci polžjih hišic. Interpretacija dobljenih rezultatov (Boato, Bodon, Giovanelli, Mildner 1989; Bole *et al.* 1990; Fechter, Falkner 1989; Kerney, Cameron, Jungbluth 1983) temelji na primerjavi z rezultati dobljenimi v izkopaninah v najbližjih jamah v Italiji (Pečina pri Bjarču - *Riparo di Biarzo*, ob Nadiži in Stenašca - *Grotta dell'Edera*, na Tržaškem krasu) (Giovanelli, 1996; Giovanelli, Rizzi Longo, Stolfa, Zucchi Stolfa 1986; Girod 1996; 2001; 2001-2002), recentnemu materialu, nabranemu v neposredni okolici spodmola, in malakofavni v Parku Škocjanske jame, ki je bila natančno raziskana v zadnjih letih (Bole, Slapnik 1998; Čarni *et al.* 2002; Slapnik, 2002).

13.1 Metode dela

Leta 1999 je bil sistematično izkopan ozek pas profila (20 x 200 x 100 cm) Viktorjeve sonde v istoimenskem spodmolu (faza IzA). Vodoravni režnji debeline 5 cm so bili posamično odstranjeni. Sledilo je mokro sejanje na sitih z velikostjo luknjic 3 mm in 1 mm ali 0,5 mm. Ostanki hišic *Helix pomatia* so bili izločeni in niso posebej obravnavani v statistični analizi. Na Biološkem inšti-

Viktorjev spodmol is located in the foothills of Vremščica (1027 m) in the valley of the river Reka on the edge of Škocjanske jame (Škocjan Caves) Park. It was formed in bedded rudist limestone. The overhang cave is the remains of a collapsed cave system of the river Reka. It opens towards to S-SE and is sunlit for most of the day, as well as being well protected from the 'burja', or north wind.

Snails often wander into the entrance part of caves and overhang caves, where the humidity is relatively high. They cling in large numbers to the walls, where many of them also die (Girod 2001). The empty shells fall to the ground and some of them remain undamaged and well preserved in the layers.

Separating and collecting malacological material from sieved and dried samples was carefully carried out for the first time in Slovenia in such research. With the use of a magnifying glass with double magnification, even small particles of snail shells were collected. The interpretation of the results obtained (Boato, Bodon, Giovanelli, Mildner 1989; Bole et al. 1990; Fechter, Falkner 1989; Kerney, Cameron, Jungbluth 1983) is based on comparison with results obtained in excavations in the closest caves in Italy (Pečina pri Bjarču - *Riparo di Biarzo*, by the river Nadiža - *Natisone* and Stenašca - *Grotta dell'Edera*, in the Triestine Karst) (Giovanelli, 1996; Giovanelli, Rizzi Longo, Stolfa, Zucchi Stolfa 1986; Girod 1996; 2001; 2001-2002), recent material collected in the immediate vicinity of the overhang cave, and malacofauna in Škocjanske jame Park, which has been carefully studied in recent years (Bole, Slapnik 1998; Čarni et al. 2002; Slapnik, 2002).

13.1 Methods of Work

In 1999, a narrow band of the profile was excavated (20 x 200 x 100 cm) in Viktor's test trench in Viktorjev spodmol (IzA phase). Horizontal spits 5 cm thick were removed individually. Wet sieving on sieves with a diameter tutu ZRC SAZU smo ostanke hišic in hišice najprej namakali 2 x po 15 min v močno razredčenem kalijevem hidroksidu (KOH), jih nato sprali z vodo in posušili. Sledila je determinacija izločenih celih in polomljenih hišic polžev in školjk iz posameznih režnjev. Na osnovi primerjav ostankov hišic s celimi hišicami smo določili vse polomljene in juvenilne hišice. Pri statistični obdelavi smo ostanke hišic (ohranjena manj kot polovica hišice) in polomljene hišice (ohranjena več kot polovica hišice) obravnavali enakovredno s celimi hišicami.

13.2 Rezultati

Rezultati analize so podani v razpredelnicah 13.1-13.3 in sl. 13.1.

13.2.1 PREGLED VRST (razpredelnici 13.1, 13.2, sl. 13.1-13.3)

Sadarji (**Cochlostomatidae**) so polžki z razmeroma majhnimi, do 1 cm visokimi, ozko stožčastimi hišicami. Večinoma živijo samo na apnencih, zato jih najlažje najdemo ob vlažnem vremenu, ko lazijo po skalah. Najpogostejša in najbolj razširjena vrsta je sedmerospiralni sadar (*Coclostoma septemspirale*), ki je severno dinarska vrsta. V Parku Škocjanske jame so bile ugotovljene tudi nekatere druge vrste tega rodu (tržaški sadar *(C. tergestinum)*, okrašeni sadar *(C. gracile)* in stopničasti sadar *(C. scalarinum)*, zato lahko upravičeno predvidevamo, da nedoločljivi ostanki hišic pripadajo tudi nekaterim tem vrstam. V Viktorjevem spodmolu je sedmerospiralni sadar v vseh režnjih prevladujoča vrsta. V 2. in 3. plasti v režnjih od 6 do 18 smo našteli več kot 200 hišic in njihovih ostankov v posameznem režnju. Več kot polovico vseh hišic (56,29 %) v izkopu pripada sedmerospiralnemu sadarju, ki je dominantna vrsta tudi v Stenašci (4321 hišic oz. 36 %). V Pečini pri Bjarču pa je prevladoval sivi stolpičasti sadar (*Coclostoma henricae)* z 52,36 % do 85,25 %.

Lepa okrogloustka (*Pomatias elegans*) iz družine okrogloustk (**Pomatiasidae**) je mediteranska in zahodno-evropska vrsta. Pri nas je splošno razširjena na Primorskem, v notranjosti pa na toplih prisojnih pobočjih. Do 1,5 cm visoka stožčasta hišica ima izrazita spiralna rebrca in prek njih še radiarna, tako je površina hišice mrežasta. Ustje je skoraj okroglo in ga zapre z močnim apnenim pokrovčkom. Ugotovljena je bila v izkopih v vseh treh jamah: v Viktorjevem spodmolu (0,76 %), v Stenašci (34 %) in v Pečini pri Bjarču (0,28 % do 34,25 %). V Viktorjevem spodmolu je bilo najdenih več ostankov hišic v režnjih od 8 do 16.

Drobne in valjaste hišice ima kopenska družina konic (**Aciculidae**). Iz rodu *Acicula* sta pri nas najpogostejši dve vrsti. Gladka, rjava in do 3 mm visoka je vitka

of holes of 3 mm and 1 mm or 0.5 mm followed. The remains of shells of *Helix pomatia* were separated and were not dealt with individually in the statistical analysis. We first soaked the remains of the shells twice for 15 minutes each at the Biological Institute ZRC SAZU in greatly diluted potassium hydroxide (KOH), and then washed them in water and dried them. A determination of the separated whole and broken shells of snails from individual spits followed. On the basis of comparison of the remains of shells with whole shells, we identified all broken and juvenile shells. In the statistical processing, we treated the remains of shells (less than half of the shell preserved) and broken shells (more than half the shells preserved) the same as whole shells.

13.2 Results

The results of analysis are given in Tables 13.1-13.3 and Fig. 13.1.

13.2.1 REVIEW OF SPECIES (Tables 13.1, 13.2, Figs. 13.1-13.3)

Cochlostomatidae are snails with relatively small, up to 1 cm high, narrow coniform shells. The majority live only on limestone, so it is easiest to find them in damp weather when they are lying on rocks. The commonest and most widespread species is *Coclostoma septemspirale*, which is a northern Dinarid species. Certain other species of this family have been found in Škocjan Caves Park (*C. tergestinum, C. gracile* and *C. scalarinum)*, so we can justifiably expect that undetermined remains of shells also belong to some of these species. In Viktorjev spodmol, *Coclostoma septemspirale* is the predominant species in all spits. In layers 2 and 3 in spits from 6 to 18, we counted more than 200 shells and their remains in individual spits. More than half of all shells (56.29%) in the excavation belong to *Coclostoma septemspirale*, which is also the predominant species in Stenašca (4321 shells or 36 %). In Pečina pri Bjarču *Coclostoma henricae* predominated with 52.36 % to 85.25 %.

Pomatias elegans from the family **Pomatiasidae** is a Mediterranean and western European species. It is generally widespread here in Primorska, and in the interior on warm, sunny slopes. The up to 1.5 cm high coniform shell has pronounced spiral ribs and radials so that the surface of the shell is reticulate. The mouth is almost circular and it closes it with a strong operculum. It was found in excavations in all three caves: In Viktorjev spodmol (0.76 %), in Stenašca (34 %) and in Pečina pri Bjarču (0.28 % to 34.25 %). In Viktorjev spodmol more remains of shells were found in spits 8 to 16.

The family of the land snails **Aciculidae** has tiny, cylindrical shells. Two species from the *Acicula* family

 VIKTORJEV SPODMOL

Razpredelnica 13.1: Geografska razširjenost vrst in njihova prisotnost v izkopih v Viktorjevem spodmolu (VS), Pečini pri Bjarču - *Riparo di Biarzo* (RB) in Stenašci - *Grotta dell'Edera* (GE) (?=velika verjetnost, da se vrsta pojavlja).
(alp., ju. evr.=alpska, južnoevropska; alp., zah. evr.=alpska, zahodnoevropska; alp., karp.=alpska, karpatska; alp., med.=alpska, mediteranska; centr., vzh. evr.=centralna, vzhodnoevropska; endemit=endemična; evr.=evropska; evr., m. az.=evropska, maloazijska; holarkt.=holarktična; jadr.=jadranska; ju. alp., ju. evr.=južnoalpska, južnoevropska; ju. alp.=južnoalpska; ju. evr.=južnoevropska; ju. vzh. alp.=južnovzhodno alpska; ju. vzh. alp., din.=južnovzhodno alpska, dinarska; ju. vzh. evr.=južnovzhodno evropska; med.=mediteranska; med. vzh. evr.=mediteranska vzhodnoevropska; sev. zah. din.=severnozahodno dinarska; sr. evr.=srednjeevropska; sr. ju. evr.=srednje južnoevropska; sr. vzh. evr.=srednje vzhodnoevropska; vzh. alp.=vzhodno alpska; vzh. alp., balk.=vzhodnoalpska, balkanska; vzh. alp., din.=vzhodnoalpska, dinarska; zah. evr.=zahodnoevropska; zah. med.= zahodno mediteranska; zah. palearkt.= zahodno palearktična).
Table 13.1: Geographical distribution of species and their presence in excavations in Viktorjev spodmol (VS), Pečina pri Bjarču - *Riparo di Biarzo* (RB) and Stenašca - *Grotta dell'Edera* (GE) (?=great probability that the species appears).
(alp., jug. evr.=Alpine, southern European; alp., zah. evr.=Alpine, western European; alp., karp.=Alpine, Carpathian; alp., med.=Alpine, Mediterranean; centr., vzh. evr.=central, eastern European; endemit=endemic; evr.=European; evr., m. az.=European, Near East; holarkt.=holarctic; jadr.=Adriatic; ju. alp., ju. evr.=southern Alpine, southern European; ju. alp.=southern Alpine; ju. evr.=southern European; ju. vzh. alp.=south-east Alpine; ju. vzh. alp., din.=south-eastern Alpine, Dinarid; ju. vzh. evr.=south-eastern European; med.=Mediterranean; med. vzh. evr.=Mediterranean eastern European; sev. zah. din.=north-western Dinarid; sr. evr.=Central European; sr. ju. evr.=central southern European; sr. vzh. evr.=central eastern European; vzh. alp.=eastern Alpine; vzh. alp., balk.=eastern Alpine, Balkan; vzh. alp., din.=eastern Alpine, Dinarid; zah. evr.=western European; zah. med.=western Mediterranean; zah. paleakt.=western Palearctic).

Vrste / Taxa	Areal	VS	RB	GE
GASTROPODA : PROSOBRANCHIA				
Cochlostomatidae				
Cochlostoma septemspirale (Razoumovsky, 1789)	ju. evr.	+		+
Cochlostoma henricae (Strobel, 1851)	vzh. alp.	?	+	
Pomatiasidae				
Pomatias elegans (O.F. Müller, 1774)	med. zah. evr.	+	+	+
Aciculidae				
Acicula lineata banki Boeters & Gittenberger, 1989	vzh. alp.	+		
Renea spectabilis (Rossmässler, 1839)	ju. vzh. alp. din.		+	
Hydrobiidae				
Sadleriana fluminensis (Küster, 1852)	ju. vzh. alp.	+		
PULMONATA : STYLOMMATOPHORA				
Cochlicopidae				
Cochlicopa lubrica (O.F. Müller, 1774)	holarkt.	+	+	+
Pyramidulidae				
Pyramidula rupestris (Draparnaud, 1801)	alp. med.	+		+
Vertiginidae				
Truncatellina claustralis (Gredler, 1856)	ju. evr.	+		
Vertigo pusilla O.F. Müller, 1774	evr. m. az.	+		+
Orculidae				
Odontocyclas kokeili (Roßmäßler, 1837)	ju. evr.		+	
Walklea rossmaessleri (Roßmäßler, 1838)	endemit		+	
Sphyradium doliolum (Bruguiere, 1792)	ju. evr.	+	+	+
Orcula dolium (Draparnaud, 1801)	alp. karp.	+		+
Pagodulinidae				
Pagodulina subdola (Gredler, 1856)	ju. alp.	+	+	
Pupillidae				
Argna biplicata (Michaud, 1831)	ju. vzh. alp.		+	
Agardhiella truncatella (L. Pfeiffer, 1846)	vzh. alp. din.	+		
Spelaeodiscus hauffeni (F. Schmidt, 1855)	endemit	+		
Chondrinidae				
Granaria illyrica (Roßmäßler, 1837)	ju . alp., ju .evr.	+	+	+
Chondrina avenacea (Bruguiere, 1792)	zah. evr. alp.	+		+
Vallonidae				
Acanthinula aculeata (O.F. Müller, 1774)	zah. paleakt.	+		
Vallonia pulchela (O.F. Müller, 1774)	holarkt.	+	+	
Buliminidae				
Chondrula tridens (O.F. Müller, 1774)	ju. vzh. evr.	+	+	+

Vrste / Taxa	Areal	VS	RB	GE
Clausiliidae				
Cochlodina fragm.		+		
Cochlodina laminata (Montagu, 1803)	evr.	+	+	+
Cochlodina costata (Pfeiffer, 1828)	ju. vzh. alp.	+	+	
Cochlodina dubiosa (Clessin, 1882)	vzh. alp.	+	+	+
Cochlodina triloba (Boettger, 1877)	med.			+
Macrogastra fragm.		+		
Macrogastra plicatula (Draparnaud, 1801)	sr. evr.	+	+	+
Macrogastra ventricosa (Draparnaud, 1801)	sr. evr.	+	+	
Macrogastra attenuata (Roßmäßler, 1835)	sr. evr.		+	+
Ruthenica filograna (Roßmäßler, 1836)	vzh. evr.	+	+	+
Erjavecia bergeri (Roßmäßler, 1836)	vzh. alp.		+	
Julica schmidti (L. Pfeiffer, 1841)	ju. vzh. alp.		+	
Clausilia dubia Draparnaud, 1805	sr. evr.		+	
Ferussaciidae				
Cecilioides acicula (O.F. Müller, 1774)	zah. evr.	+		
Oleacinidae				
Poiretia cornea (Brumati, 1838)	jadr.	+	+	+
Testacellidae				
Testacella scutulum Soverby, 1823	med.			+
Punctidae				
Punctum pygmaeum (Draparnaud, 1801)	holarkt.	+		
Discidae				
Discus perspectivus (Megerle von Mühlfeldt, 1816)	vzh. evr.	+	+	
Vitrinidae				
Vitrinobrachium breve (Férussac, 1821)	sr. vzh. evr.		+	+
Zonitidae				
Vitrea fragm.		+		
Vitrea diaphana erjaveci (Brusina, 1870)	sev. zah. din.	+		
Vitrea subrimata (Reinhardt, 1871)	alp. ju .evr.	+		
Aegopis fragm.		+		
Aegopis verticillus (Lamarck, 1822)	vzh. alp. balk	+	+	+
Aegopis gemonensis kusceri A.J. Wagner, 1912	endemit	?	+	
Aegopis gemonensis gemonensis (A. Férussac, 1832)	ju. vzh. alp.	?		
Aegopinella sp.		+	+	
Aegopinella minor (Stabile, 1864)	centr. vzh.evr.			+
Oxychilus sp.		+	+	
Oxychilus cfr. *Draparnaudi* (Back, 1837)	zah. med.			+
Limacidae				
Limax sp.		+	+	+
Lehmannia sp.				+
Bradybaenidae				
Fruticicola fruticum (O.F. Müller, 1774)	evr.	+	+	
Hygromiidae				
Trichia hispida (Linnaeus, 1758)	evr.	+		+
Trichia leucozona leucozona (C. Pfeiffer, 1828)	ju. vzh. alp.	+	+	
Monachoides incarnatus (O.F. Müller, 1774)	sr. ju. evr.			+
Monacha cartusiana (O.F. Müller, 1774)	med. vzh. evr.	+	+	+
Helicodonta obvoluta (O.F. Müller, 1774)	sr. evr.	+	+	+
Helicidae				
Campylaea fragm.		+		
Campylaea illyrica (Stabile, 1864)	ju. vzh. alp. din.	+	+	+
Kosicia intermedia (A. Férussac, 1832)	ju. vzh. alp.	+	+	+
Cepaea nemoralis (Linnaeus, 1758)	ju. evr.	+	+	+
Helix pomatia Linnaeus, 1758	sr. ju. evr.	+	+	
Helix cincta O.F. Müller, 1774	med.	?		+

konica (*A. gracilis*), ki je precej razširjena. Le v zahodni Sloveniji pa najdemo črtasto konico (*A. lineata banki*) z drobnimi, žlebičastimi in neenakomerno razporejenimi

are most common here. *A. gracilis* is smooth, brown and up to 3 mm high and is fairly widespread. *A. lineata banki*, with tiny, grooves and unequal distribution of lines

VIKTORJEV SPODMOL

Razpredelnica 13.2: Viktorjev spodmol: število hišic in ostankov hišic določene vrste v posameznem režnju, vsota in odstotek hišic posamezne vrste v odvisnosti od vseh hišic.
Table 13.2: Viktorjev spodmol: number of shells and remains of shells of specific species in individual spits, total of all shells and percentage of shells of individual species in relation to all shells.

Vrste/Režnji Taxa/Spits	Nasutje Disturbed		Plast 1 in 2 Layer 1–2			Plast 2 Layer 2									Plast 3 Layer 3					SKUPAJ TOTAL	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Št. hiš. Shell count	%
Cochlostoma septem.	49	102	41	65	91	244	329	351	162	216	219	400	576	404	526	486	400	281	104	5046	56,29
Pomatias elegans				1	1	1	1	4	6	13	7	7	10	5	5	6	1			68	0,76
Acicula lineata banki			1		1	2	3	1					1		1		1			11	0,12
Sadleriana fluminensis					8						6	0	43	19	34	2	62	7		181	2,02
Cochlicopa lubrica										1					1					2	0,02
Pyramidula rupestris									1			3							2	6	0,07
Truncatellina claustralis						2														2	0,02
Vertigo pusilla		5	8	1	1	2	9	2				1				2				31	0,35
Sphyradium doliolum			1					1			3	5	7	12	6	25	11	6	1	78	0,87
Orcula dolium														1	13		3		1	18	0,20
Pagodulina subdola											1									1	0,01
Agardhiella truncatella		3		1		2	2			1			7	4	1	2	2	1		26	0,29
Spelaeodiscus hauffeni											1									1	0,01
Granaria illyrica	1	7	5	10	6	17	64	53	21	15	12	15	11	14	13	22	14	27	8	335	3,74
Chondrina avenacea	4	5	2	1	2	24	12	3	7	1			2	4	9	3	1	1		81	0,90
Acanthinula aculeata	2	14	11	5						1		4	6	5	1	1	1			51	0,57
Vallonia pulchela						1	1	2				1	2	3	3	3	3	3		22	0,25
Chondrula tridens		2																		2	0,02
Cochlodina fragm.	11	7	6	5	8	9	28	70	27	80	24	151	174	143	209	82	141	25	64	1264	14,10
Cochlodina laminata											0		8	6	3	8	2	27	2	56	0,62
Cochlodina costata									4	1		4		6	25		8		4	52	0,58
Cochlodina dubiosa																19		1		20	0,22
Macrogastra fragm.	1	5	2	3			4	2	24	33	18	42	118	79	163	212	52	130	10	898	10,02
Macrogastra plicatula		1							5	3	5	14	31	5	7	20	10	3	4	108	1,20
Bulgarica vetusta																2				2	0,02
Ruthenica filograna		2	3					5	1	2	52	3	8	12	27	68	15	14	5	217	2,42
Cecilioides acicula								1	4	3	1	4	12	7	8	3	4	5	1	53	0,59
Poiretia cornea								1												1	0,01
Punctum pygmaeum											2					1				3	0,03
Discus perspectivus	0		0		0		1	3	2	0	8	5	10	10	18	24	3	3	4	91	1,02
Vitrea fragm.							1						1			1				3	0,03
Vitrea diaphana erjaveci												2			4		1			7	0,08
Vitrea subrimata								1		3	2	2	7	4	1	2	1			23	0,26
Aegopis fragm.													2							2	0,02
Aegopis verticillus														1	3		1			5	0,06
Aegopis gemonensis g.																3				3	0,03
Aegopinella fragm.		1				2				4	13	9	17	4	3	12	4	2		71	0,79
Limax sp.		1		5		3			2	1	2	1	3	2		3	1	5		29	0,32
Fruticicola fruticum											3		2		8	1	2			16	0,18
Trichia hispida						1								1	3	2			1	8	0,09
Trichia leucozona																			1	1	0,01
Monacha cartusiana										1		0		2	1					4	0,04
Helicodonta obvoluta							1							6	2					9	0,10
Campylaea fragm.		3	1								4	4	6	3	1	3				25	0,28
Campylaea illyrica		1			3	1							2	1	1	2			1	12	0,13
Cepaea nemoralis									1					1		1				3	0,03

črtami na površini. V talnem vzorcu okrog spodmola smo našli obe vrsti v približno enakem razmerju, medtem ko je bila v izkopih ugotovljena le črtasta konica z 0,12 %. Nobena od konic ni bila ugotovljena v obeh italijanskih jamah.

Sadlerijana *(Sadleriana)* (**Hydrobiidae**) je izvirski rod s tremi vrstami, ki jih najdemo v izvirih in hladnih potokih v zahodni in južni Sloveniji. Najbolj razširjena

on the surface is only found in western Slovenia. Both species were found in roughly the same proportion in soil samples around the overhang cave, while in the excavations, only *A. lineata banki* was found, with 0.12 %. Neither species was found in the two Italian caves.

Sadleriana (**Hydrobiidae**) is a spring water genus with three species, found in springs and cold streams in western and southern Slovenia. *S. fluminensis* is most

Plast Layer	Reženj Spit	Globina (cm) Depth (cm)	Število vrst Taxa count	Število hišic Shell count	Indeks 1 Index 1
nasutje disturbed	1	254	6	68	11,33
	2	259	13	159	12,23
1 in 2 1 and 2	3	264	10	81	8,10
	4	269	10	97	9,70
	5	274	9	121	13,44
2	6	279	13	311	23,92
	7	284	12	456	38,00
	8	289	15	500	33,33
	9	294	13	267	20,54
	10	299	16	379	23,69
	11	304	17	383	22,53
	12	309	18	677	37,61
	13	314	22	1066	48,45
	14	319	26	764	29,38
3	15	324	27	1100	40,74
	16	329	26	1021	39,27
	17	334	24	744	31,00
	18	339	16	541	33,81
	19	344	14	213	15,21
SKUPAJ / TOTAL				**8948**	

Razpredelnica 13.3: Primerjava posameznih plasti v odvisnosti od števila vrst in števila hišic.
Table 13.3: Comparison of individual layers in relation to number of species and number of shells.

je rečna sadlerijana (*S. fluminensis*), ki ima do 5 mm visoke, stožčaste hišice. V režnju 5 in režnjih od 11 do 18 je bilo ugotovljenih 181 (2,01 %) ostankov hišic rečne sadlerijane. Njena prisotnost in visok delež postavljata Viktorjev spodmol na posebno mesto.

Mlakarji (**Lymnaeidae**) so, kot pove ime, prebivalci mlak in stoječih ter počasi tekočih vod. Ker niso zahtevni, jih najdemo tudi v vodah, kjer so življenjske razmere zelo neugodne. Dokaj razširjen in za neugodne razmere odporen je mali mlakar (*Galba truncatula*), ki zraste do 1 cm. Pogosto lazi ob vodah po blatu in rastlinah. V 15. izkopu je bil najden ostanek hišice, kar kaže na nekakšno povezavo z vodo.

Družina polžic (**Cochlicopidae**) ima le tri vrste rodu polžica (*Cochlicopa*). To so polži s podolgovatimi ovalnimi in bleščečimi hišicami, visokimi le do 7 mm. Gladka polžica (*Cochlicopa lubrica*) meri do 7 mm. Je vrsta, ki živi na razmeroma vlažnih mestih. Najdemo jo v nižinah, zlasti v naplavinah pa tudi v tanatocenozah v studencih. Le po 2 hišici sta bili najdeni v Stenašci in v Pečini pri Bjarču ter tudi v Viktorjevem spodmolu, in to v 10. in 15. režnju.

Iz družine piramidic (**Pyramidulidae**) pri nas živi skalna piramidica (*Pyramidula rupestris*), ki je ekološko posebno zanimiva, ker jo najdemo na skalah od morja pa tja do najvišjih vrhov v Alpah. Vrsta je majhna, nizko piramidaste hišice merijo komaj 3 mm. Nekaj hišic je bilo najdenih v plasteh v Štenašci (6) in v Viktorjevem spodmolu (6 oz. 0,07 %).

Zelo drobni so polži iz družine vertiginid (**Vertiginidae**). Zelo pogostne so vrste rodu *Vertigo*. Hišice so majhne, merijo le do 2,5 mm, so zaobljene in imajo v ustju 3 do 11 zobcev. Levozaviti vrtenec (*Vertigo pusilla*) je najpogostejši v listnatih gozdovih, vendar na manj

widespread, which has a coniform shell up to 5 mm high. In spit 5 and spits 11 to 18, 181 (2.01 %) remains of shells of this species were found. Its presence and high share put Viktorjev spodmol in a special place.

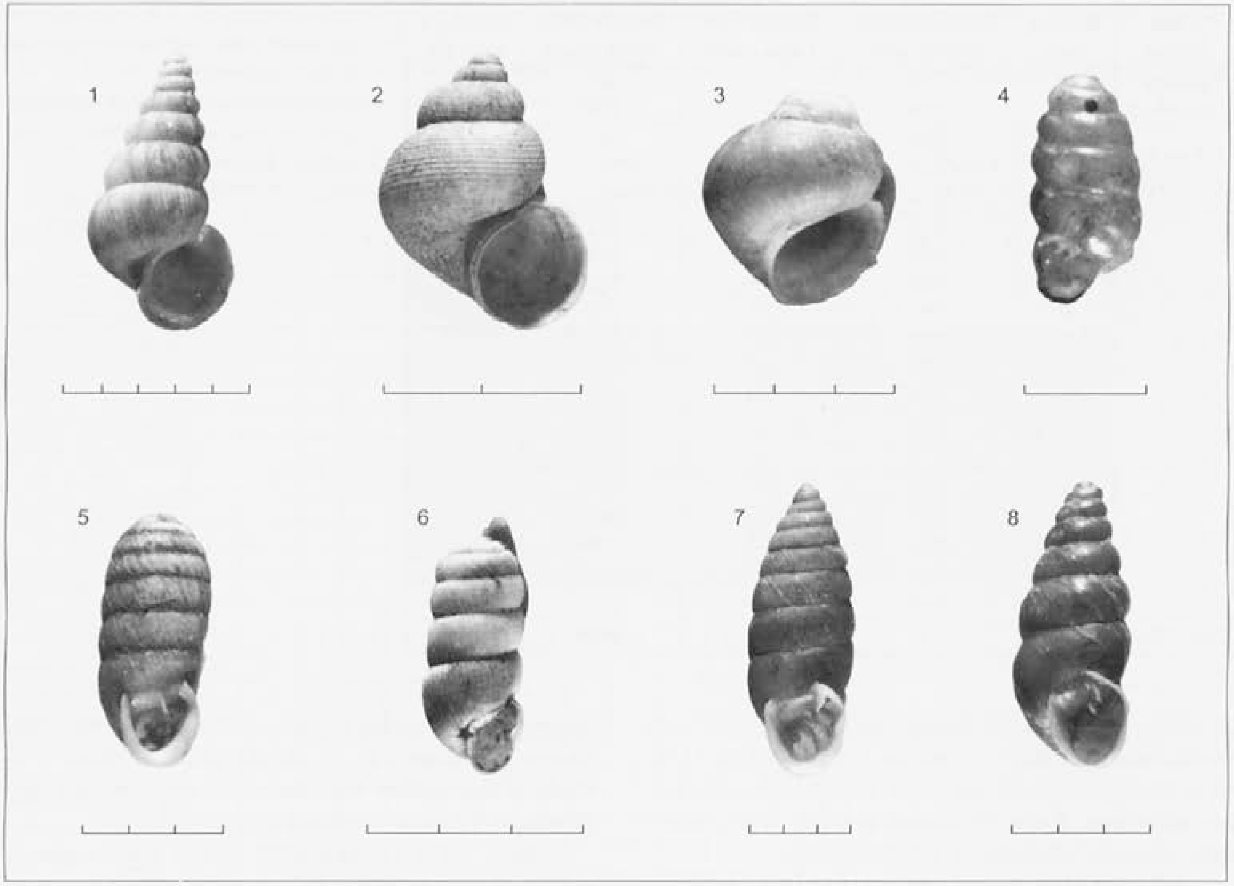
Pond snails (**Lymnaeidae**), as the name suggests, are inhabitants of ponds and standing and slow moving waters. Since they are not demanding, they can also be found in waters in which living conditions are very unfavourable. *Galba truncatula*, which grows up to 1 cm, is fairly widespread and resistant to unfavourable conditions. It often creeps along mud and plants beside water. The remains of shells were found in spit 15, which indicates some kind of link with water.

The **Cochlicopidae** has only three species of the genus *Cochlicopa*. These are snails with longish oval glittering shells up to 7 mm high. *Cochlicopa lubrica* measures up to 7 mm in height. It is a species that lives in relatively damp places. It is found in the lowlands, especially on alluvia but also in tanatocenoses in springs. Only two shells each were found in Stenašca and in Pečina pri Bjarču and also in Viktorjev spodmol, in spits 10 and 15.

Only *Pyramidula rupestris* from the **Pyramidulidae** family lives here. Ecologically it is especially interesting, since it is found on rocks from the sea to the highest peaks of the Alps. The species is small, the low pyramidal shells measure barely 3 mm. Some shells were found in layers of Štenašca (6) and in Viktorjev spodmol (6 or 0.07 %).

Snails from the **Vertiginidae** family are very tiny. Species of the genus *Vertigo* are very common. The shells are small, measuring only up to 2.5 mm, they are rounded and have 3 to 11 teeth in the mouth. *Vertigo pusilla* is commonest in deciduous forest, but in less damp places. It was present in Viktorjev spodmol in spits 2 to 8 and also in spits 12 and 16. Its share is 0.35 %. It is

VIKTORJEV SPODMOL



Sl. 13.1: Cochlostoma septemspirale (1), *Pomatia elegans* (2), *Sadleriana fluminensis* (3), *Vertigo pusilla* (4), *Sphyradium doliolum* (5), *Agardhiella truncatella* (6), *Granaria illyrica* (7) in *Chondriana avenacea* (8). Merila so podana v mm. Foto M. Grm.
Fig. 13.1: Cochlostoma septemspirale (1), *Pomatia elegans* (2), *Sadleriana fluminensis* (3), *Vertigo pusilla* (4), *Sphyradium doliolum* (5), *Agardhiella truncatella* (6), *Granaria illyrica* (7) and *Chondriana avenacea* (8). Measurements are given in mm. Photo M. Grm.

vlažnih mestih. V Viktorjevem spodmolu je bil prisoten v režnjih 2 do 8 ter tudi v 12. in 16. režnju. Njegov delež je 0,35 %. Precej manj je značilen v Stenašci kjer je bila najdena le ena hišica.

Ozke, stolpičaste in le do 2 mm visoke hišice ima rod debelnic (*Truncatellina*). Samo 2 hišici svetle debelnice (*Truncatellina claustralis*) sta bili najdeni v 6. režnju. V talnem vzorcu okrog spodmola je vrsta zelo pogosta in je z deležem 15,07 % na drugem mestu. Majhnost hišic pogojuje njene redke najdbe v Viktorjevem spodmolu in njeno odsotnost v Stenašci in v Pečini pri Bjarču.

Med sodčkastimi polži (**Orculidae**) je najpogostejša vrsta mali sodčkasti polž (*Sphyradium doliolum*). Višina hišic je do 5,5 mm. Zanimivo pa je, da imajo hišice zaobljen vrh in so pod vrhom razširjene, proti ustju pa se svitek nekoliko zoži. Pojavlja se v plasteh v vseh 3 jamah. V Viktorjevem spodmolu pa je reden v režnjih od 11 do 19. Njegov delež ni zanemarljiv saj z 78 ostanki hišic predstavlja 0,87 %. V 15. režnju s 13 hišicami izstopa veliki sodčkasti polž (*Orcula dolium*) ki je bil tudi najden le v Viktorjevem spodmolu (0,2 %).

much less characteristic in Stenašca, where only one shell was found.

The genus *Truncatellina* has a narrow spiral, only up to 2 mm high shell. Only 2 shells of *Truncatellina claustralis* were found in spit 6. The species is very common in soil samples around the overhang cave and has a share of 15.07 % in other places. The smallness of the shell conditions the rarity of finds in Viktorjev spodmol and its absence in Stenašca and in Pečina pri Bjarču.

Among **Orculidae,** the species *Sphyradium doliolum* is most common. The shell is up to 5.5 mm high. It is interesting that the shells have rounded tops and widen below the top, and the coil narrows slightly towards the mouth. It appears in the layers in all three caves. In Viktorjev spodmol it is regular in spits 11 to 19. Its share is not negligible, since with 78 remains of shells it represents 0.87%. In spit 15, *Orcula dolium* stands out with 13 shells, and this species was also found only in Viktorjev spodmol (0.2 %).

The genus *Pagodulina*, from the family **Pagodulinidae** contains considerably smaller species, measuring

Precej manjše vrste ima rod pagodice (*Pagodulina*), iz družine **Pagodulinidae** merijo le do 3,5 mm. Rebraste hišice so zaobljeno valjaste in se svilnato svetijo. Globoko v ustju imajo za sistematsko razdelitev pomembne zobce in gube. Živijo v stelji in rahli zemlji. V 11. režnju je bila najdena le polomljena hišica južne pagodice (*Pagodulina subdola*).

V družini pupilid (**Pupillidae**) sta bila najdena *Agardhiella truncatella* s 26 polomljenimi hišicami, ki so bile razporejene z 1 do nekaj primerkov po večini režnjev, in jamski plošček (*Spelaeodiscus hauffeni*) z 1 hišico v 11. režnju.

Iz družine ovsark (**Chondrinidae**) se na apnenih skalah običajno pojavlja bolj zašiljena temno rdečkastorjava ovsarka (*Chondrina avenacea*) s 7 gubami v ustju. Najštevilčnejša je bila v 6. in 7. režnju. Razen v 11., 12. in 19. režnju se pojavlja v vseh drugih izkopih. Njen delež je 0,9 %. V Stenašci so bile najdene le 3 hišice. Na toplih, prisojnih legah v notranjosti Slovenije, in povsod v Primorju živi ilirska sirotica (*Granaria illyrica*) z zelo spremenljivimi, svetlo rjavimi, 6–11 mm visokimi hišicami, ki so valjaste, vrh svitka pa je obokano stožčast. V ustju je 8 gub. Pojavlja se vseh 3 jamah in je precej pogosta. V Viktorjevem spodmolu po številu najdenih hišic dominirata 7. in 8. reženj. S 3,72 % deležem sodi med vrste, ki označujejo posamezne režnje. Ilirska sirotica je skromno zastopana v Pečini pri Bjarču. Precej več hišic je bilo najdenih v Stenašci.

Zelo razširjene vrste so iz družine travnih polžev (**Valloniidae**). Rod *Vallonia* ima nekaj zelo razširjenih vrst, ki jih zlasti v naplavinah najdemo množično. Hišice so sploščene, imajo širok popek in zaokroženo ustje z odebeljenim ustnim robom. Premer hišic je do 2,7 mm. Najpogostejši je gladki travni polž (*Vallonia pulchella*). Najdemo ga od nižin do visokih gora. Pogostejši je bil v režnjih 14 do 17 (0,25 %). V Pečini pri Bjarču so našli 3 hišice, v Stenašci pa ni bila evidentirana.

Družina požrešnikov (**Enidae**) ima v Sloveniji 5 rodov in le 6 vrst. Po toplih prisojnih legah, še posebej na Primorskem, je razširjen trizobi požrešnik (*Chondrula tridens*), ki se pojavlja v izkopih v vseh treh jamah. V Viktorjevem spodmolu sta bila v 2. režnju najdena 2 ostanka hišic.

Zelo pogosta in najrazličnejšim življenskim razmeram prilagojena družina so zaklepnice (**Clausiliidae**). Za vse je značilno, da imajo ozke, visoke, vretenaste hišice, ki so zavite na levo in imajo zato ustje na levi strani. V ustju imajo gube, ki so pomembne za sistematiko, pa tudi posebno ploščico, s katero zapro ustje. Družina je razdeljena na nekaj poddružin in veliko rodov. Veliko polomljenih in še več ostankov hišic (14,1 %), ki jim ni mogoče določiti vrstno pripadnost, pripada rodu *Cochlodina*. Dominirajo v 2. in 3. plasti v režnjih 12 do 16. Cele hišice in take z nepoškodovanim ustjem smo uvrstili v tri vrste, ki so običajne v tem delu Slovenije. Gladka zaklepnica (*Cochlodina laminata*) in dvomljiva zaklep-

only up to 3.5 mm. The ribbed shells are rounded cylindrical and have a silky gleam. They have teeth and folds deep in the mouth, which are important for systematic division. They live in litter and light soil. Only one broken shell of *Pagodulina subdola* was found in spit 11.

From the **Pupillidae** family were found *Agardhiella truncatella* with 26 broken shells distributed with 1 to several specimens in the majority of spits, and *Spelaeodiscus hauffeni* with a shell in spit 11.

The more pointed dark red-brown *Chondrina avenacea*, with seven folds in the mouth, from the **Chondrinidae** family, normally appears on limestone rocks. It was most numerous in spits 6 and 7. Except in spits 11, 12 and 19, it appears in all other excavations. Its share is 0.9 %. Only three shells were found in Stenašca. *Granaria illyrica*, with very changeable, light brown, 6–11 mm high shells which are cylindrical, and the top of the coil is vaulted conical. It has 8 folds in the mouth. It appears in all 3 caves and is fairly common. In Viktorjev spodmol, in terms of number of shells found, spits 7 and 8 dominate. With 3.72 % share it is among species that characterise individual spits. *Granaria illyrica* is modestly represented in Pečina pri Bjarču. A considerable number of shells was found in Stenašca.

Species from the Grass Snail family (**Valloniidae**) are very widespread. The genus *Vallonia* has some very widespread species which are found en masse, particularly in alluvium deposits. The shells are disc-shaped, they have a wide umbilicus and a round mouth with thickened lip. The diameter of the shell is up to 2.7 mm. *Vallonia pulchella* is the commonest. It is found from lowlands to the high mountains. It was most frequent in spits 14 to 17 (0.25 %). Three shells were found in Pečina pri Bjarču, but it was not recorded in Stenašca.

Enidae has five genera and only 6 species in Slovenia. *Chondrula tridens*, which appears in excavations in all three caves, is widespread in warm, sunny locations, especially in Primorska. Two remains of shells were found in Viktorjev spodmol in spit 2.

Clausiliidae are a very common family adapted to the most varied living conditions. All are characterised by a narrow, high spindle-shaped sinistral coiled shells and thus have the mouth on the left side. They have folds in the mouth which are important for systematic identification and also special plates by which the aperture is closed. The family is divided into several subfamilies and a large number of genera. A lot of broken and even more remains of shells (14.1 %), to which it was not possible to determine species affiliation, belong to the genus *Cochlodina*. They dominate in layers 2 and 3 in spits 12 to 16. We classified whole shells and those with undamaged apertures into three species which are common in this part of Slovenia. *Cochlodina laminata* and *Cochlodina dubiosa* were also found in excavations in Pečina pri Bjarču and Stenašca, while *Cochlodina costata* also appears in soil samples in front of the cave.

nica (*Cochlodina dubiosa*) sta bili najdeni tudi v izkopih v Pečini pri Bjarču in Stenašci, medtem ko se rebrasta zaklepnica (*Cochlodina costata*) pojavlja tudi v talnem vzorcu pred jamo.

Ovalno ali zaokroženo ustje, brez žleba na bazi ustja, imajo vrste rodu *Macrogastra*. Za vse vrste in podvrste tega rodu je značilno, da imajo na hišicah vzdolžna rebra ali močne proge. V izkopih predstavljajo 11,22 % delež. Vse cele hišice in hišice z nepoškodovanim ustjem pripadajo gubasti zaklepnici (*M. plicatula*), z gubami ob ustnem robu. Vrsta prevladuje v 2. in 3. plasti (1,2 %). Prisotna je tudi v Pečini pri Bjarču in Stenašci. Ostanki hišic verjetno pripadajo tudi trebušasti zaklepnici (*M. ventricosa*), ki je bila najdena tudi v Pečini pri Bjarču. Hišice so visoke do 1,9 cm. V ustju ima le malo gub. V 16. režnju sta bili najdeni tudi 2 hišici vitke zaklepnice

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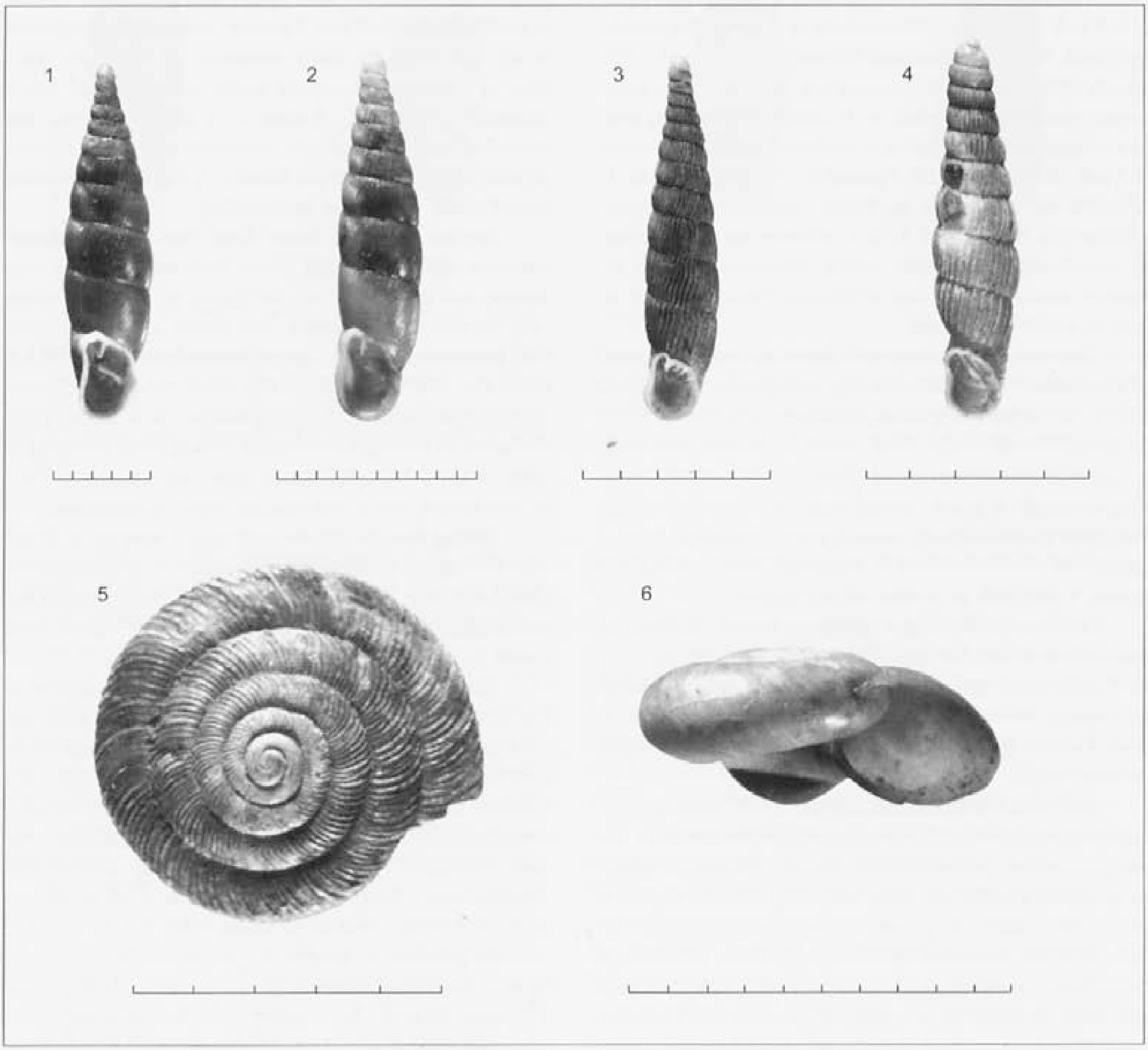
Species of the genus *Macrogastra* have oval or rounded apertures, without a groove at the base of the aperture. It is characteristic of all species and sub-species of this genus are characterised by a horizonal rib or strong stripes. They represent an 11.22 % share in excavations. All whole shells and shells with undamaged aperture belong to *M. plicatula*, with folds by the margin of the aperture. The species prevails in layers 2 and 3 (1.2 %). It is also present in Pečina pri Bjarču and Stenašca. Remains of shells probably also belong to *M. ventricosa*, which was also found in Pečina pri Bjarču. The shells are up to 1.9 cm high. It has only a small fold in the mouth. Two shells of *Bulgarica vetusta* were also found in spit 16, which is a southern European species. It inhabits the sub-Mediterranean area here.

Ruthenica filograma is among the smallest of the



Sl. 13.2: Cochlodina laminata (1), *Cochlodina costata* (2), *Macrogastra plicatula* (3), *Ruthenica filograna* (4), *Discus perspectivus* (5) in *Aegopinella* sp. (6). Merila so podana v mm. Foto M. Grm.
Fig. 13.2: Cochlodina laminata (1), *Cochlodina costata* (2), *Macrogastra plicatula* (3), *Ruthenica filograna* (4), *Discus perspectivus* (5) and *Aegopinella* sp. (6). Measurements are given in mm. Photo M. Grm.

(*Bulgarica vetusta*), ki je južno evropska vrsta. Pri nas naseljuje submediteransko regijo.

Med naše najmanjše zaklepnice sodi ljubka zaklepnica (*Ruthenica filograma*), ki ima le do 9 mm visoke, močno rebraste hišice s širokim vrhom. Je precej pogosta v 2. in 3 plasti in z 2,41 % predstavlja nezamerljivi del. V znatno manjšem številu je prisotna tudi v Pečini pri Bjarču in Stenašci.

Ferussaciidae so družina polžev z ozkimi in steklastimi hišicami. V zemlji in stelji živi igličasta ahatnica (*Cecilioides acicula*). Vrsta je bila ugotovljena le v Viktorjevem spodmolu. Pojavlja se v drugi in tretji plasti redno od 8. do 19. režnja. Najdenih je bilo 53 (0,59 %) ostankov hišic.

Želodčarka oz. sredozemska roparica (*Poiretia cornea*) iz družine **Oleacinidae** ima razmeroma nežno, rumenorjavo in do 5 cm visoko hišico. Hrani se predvsem z drugimi polži, ki jim s kislim izločkom slinavk raztopi hišico in z močno strgačo pospravi mehke dele. Vrsta je pogosta v toplih predelih zahodne Slovenije. S po nekaj hišicami (1-6) se pojavlja v vseh treh jamah.

Pikčarji (**Punctidae**) so majhni ali zelo majhni polži s sploščenimi hišicami, zelo širokim popkom, na površini pa so progaste ali drobno rebraste. Med zelo majhne in splošno razširjene vrste sodi pikčar (*Punctum pygmaeum*). Hišice te vrste so visoke do 0,8 mm, premer pa je do 1,6 mm. Najdemo jih v gozdovih, na travnikih, pod odpadlim listjem in trhlim lesom, v nižinah in visoko v planinah. Verjetno je krhkost in majhnost hišic vzrok, da so bile najdene le v Viktorjevem spodmolu. V 11. in 16. režnju so bile najdene 3 hišice.

Do 7 mm široke, dlakaste hišice ima gredljasta razprojica (*Discus perspectivus*) iz družine razprojic (**Discidae**). Pojavlja se v 2. in 3. plasti. Prevladuje v 15. in 16. režnju. Njen delež je več kot 1 %, kar je v nasprotju z le 2 hišicama iz Pečine pri Bjarču in nobeno hišico v Stenašci.

Družina pasarjev (**Zonitidae**) ima pri nas 8 rodov in veliko vrst. Med manjše sodi red kristalic (*Vitrea*) s prosojnimi, sploščenimi hišicami, ki niso večje od 5 mm. Splošno razširjena je luknjasta kristalica (*V. subrimata*). Najdemo jo v gozdovih med listjem, pod kamenjem, med grmovjem in na travnikih. V gorah živi do višine 2500 m. Sorodna je podvrsta Erjavčeva kristalica (*V. diaphana erjaveci*), razširjena v zahodni Sloveniji. Hišice in nedoločene polomljene hišice obeh vrst se pojavljajo v manjšem številu v 2. in 3. plasti. Dominira luknjasta kristalica z 0,26 %.

V gozdovih pod trhlim lesom in kamni živi do 1,3 cm velika, sploščena, z zelenkastimi ali rjavimi hišicami vrsta širokousti bleščeči polž (*Aegopinella nitens*). Ostanki hišic (0,79 %), najdenih v režnjih od 10 do 18, najverjetneje pripadajo omenjeni vrsti ter sorodni vrsti (*Aegopinella minor*), ki se tudi pojavlja v submediteranskem prostoru.

Soroden in oblikovno podoben rod je rod *Oxychi-*

Macrogastra in Slovenia, the shell of which is only up to 9 mm heigh, strongly ribbed with a wide apex. It is fairly frequent in layers 2 and 3 and with 2.41 % represents a significant share. It is also present in smaller numbers in Pečina pri Bjarču and Stenašca.

Ferussaciidae are a family of snails with narrow glass shaped shells. *Cecilioides acicula* lives in earth and litter. The species was only found in Viktorjev spodmol. It appears regularly in layers 2 and 3 from spits 8 to 19. Fifty-three (0.59 %) remains of shells were found.

Poiretia cornea, from the family **Oleacinidae** has a relatively soft, yellowy brown, up to 5 cm high shell. It feeds mainly on other snails, whose shells it dissolves with an acid secreting saliva and removes the soft parts with a strong radula. The species is frequent in warm parts of western Slovenia. A few shells (1-6) appear in each of the three caves.

Punctidae are small or very small snails with an oval shell, very wide umbilicus, and on the surface they are striped or finely ribbed. Among the very small and generally widespread species is *Punctum pygmaeu*. The shells of this species are up to 0.8 mm high, and the diameter to 1.6 mm. They are found in forests, on meadows, under fallen leaves and rotting wood, in the lowlands and high in the mountains. The fragility and smallness of the shell is probably why they were only found in Viktorjev spodmol. Three shells were found in spits 11 and 16.

Discus perspectivus from the **Discidae** family has an up to 7 mm wide, hairy shell. It appears in layers 2 and 3. It predominates in spits 15 and 16. Its share is more than 1%, which is in contrast to the only 2 shells from Pečina pri Bjarču and no shells in Stenašca.

The family of **Zonitidae** has 8 genera here and a large number of species. Among the smaller is the order *Vitrea*, with transparent oval shells not larger than 5 mm. *V. subrimata* is generally widespread, found in forests among leaves, under rocks, among shrubs and on meadows. It lives in the mountains to an altitude of 2500 m. The sub-species *V. diaphana erjaveci*, widespread in western Slovenia, is related. Shells and unidentified broken shells of the two species appear in small numbers in layers 2 and 3. *V. subrimata* predominates with 0.26 %. The up to 1.3 cm large, oval, greenish or brown shelled species *Aegopinella nitens* lives in forests under rotten wood and stones. The remains of shells (0.79 %), found in spits from 10 to 18 probably belong to this species and the related species *Aegopinella minor*, which also appears in the sub-Mediterranean space. The genus *Oxychilus* with 4 species that live scattered through Slovenia is related and similarly shaped. Nine broken shells were found in spits 7, 14 and 15. The largest species of this family is *Aegopis verticillus*, the diameter of the shell is up to 3.5 cm. The low, coniform shell has a finely reticulate sculpture on the upper side, and the lower side is smooth and shining. The species is very wides-

lus s 4 vrstami, ki živijo raztresene po Sloveniji. Devet polomljenih hišic smo našli v 7., 14. in 15. režnju.

Največja vrsta te družine je navadni pasar (*Aegopis verticillus*), premer hišice je do 3,5 cm. Nizko stožčasta hišica ima na zgornji strani drobno mrežasto skulpturo, spodnja stran pa je gladka in bleščeča. Vrsta je zelo razširjena, najbolj v nižjih predelih Alp, v predgorjih in na krasu. Najdenih je bilo le nekaj (7) ostankov hišic v 13., 14., 15. in 17. režnju. Nekateri med njimi bi lahko pripadali tudi huminskemu (*Aegopis gemonensis gemonensis*) in kuščerjevemu pasarju (*Aegopis gemonensis kusceri*). Oba se pojavljata na krasu. Kuščerjev pasar je bil najden v Pečini pri Bjarču.

Družina slinarjev (**Limnacidae**) so veliki goli polži, ker jim je hišica zakrnela in je ohranjena le kot drobna ploščica, ki je skrita pod ščitom. Slinarji se med seboj ločijo po ščitu, ki ima koncentrične gube, dihalnica pa je na desni strani na zadnji polovici ščita. Pri nas je najpogostejši črni slinar (*Limax cinereoniger*), ki ga ob vlažnem vremenu srečamo povsod po gozdovih. Zraste do 20 cm, navadno je črn, najdemo pa tudi prodaste, sive, rjave in celo rdečkaste. Na krasu prevladuje rumeni slinar (*Limax flavus*), ki je precej manjši. V večini režnjev so bile najdene manjše ploščice (26) le v režnjih 10, 12 in 14 smo našli po eno večjo ploščico.

Grmovni polž (*Bradybaena fruticum*) je pri nas edini polž iz družine grmovnih polžev (**Brabybaenidae**). Hišice te vrste so gladke, zaokrožene in malo sploščene, belkaste ali rumenkaste, redkeje rahlo rožnate, prosojne, široke so do 2,5 cm, s širokim popkom. Vrsta je najpogostejša na prisojnih legah, poraslih z grmovjem. Najden je bil od 11. do 18. režnja s po nekaj hišicami. Le v 15. režnju je bilo najdenih 8 polomljenih hišic. V Pečini pri Bjarču so našli v prvih štirih plasteh po eno hišico.

Zelo veliko vrst ima družina listnih polžev (**Hygromiidae**), ki so razdeljeni v nekaj poddružin. Nekaj polomljenih hišic dlakavih polžev rodu *Trichia* v 2. in 3. plasti pripada navadnemu dlakavemu polžu (*T. hispida*) in dlakavemu polžu (*Trichia leucozona*).

Na toplih in odprtih legah živi kartuzijanka (*Monacha carthusiana*). Njene nekoliko sploščene hišice so tanke in prosojne, zrastejo pa do 1,5 cm. V 10., 14. in 15. režnju so bile najdene 4 polomljene hišice. Kartuzijanka je bila ugotovljena tudi v Pečini pri Bjarču in Stenašci.

Zelo veliko vrst ima družina vrtnih polžev (**Helicidae**). Najpogostejši in najbolj razširjen je ilirski stenski polž (*Campylaea illyrica*). Rjave sploščene in bleščeče hišice imajo premer od 3,5 cm. Najraje živi v gozdovih gorskega sveta, najdemo pa ga tudi v nižinah, zlasti v grmičih. Med nedoločljivimi ostanki se pojavlja tudi koroški stenski polž (*Kosicia intermedia*). Ostanki hišic obeh vrst so bili najdeni v vseh treh plasteh.

Rod malih vrtnih polžev (*Cepaea*) ima pri nas tri vrste. Gozdni polž (*C. nemoralis*) ima 2,5 cm široke in do 2 cm visoke hišice, ki so različno pisane in različnih osnovnih barv. Ustni rob in okolica popka sta vedno

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pread, most in the lower parts of the Alps, in the foothills and on Kras (Karst). Only a few (7) remains of shells were found in spits 13, 14, 15 and 17. Some of them may also belong to *Aegopis gemonensis gemonensis* and *Aegopis gemonensis kusceri*. Both appear on Kras. *A. gemonensis kusceri* was found in Pečina pri Bjarču.

The family of **Limnacidae** are large slugs, because the shell is atrophied and is only preserved as a tiny platelet hidden under a mantle. Limnacidae are distinguishable by the mantle, and the respiratory pore is on the right side in the last half of the mantle. *Limax cinereoniger*, is the commonest here, and can be met throughout the forests in damp weather. It grows up to 20 cm, is normally black but can also be striped, grey, brown or even redish. *Limax flavus*, which is considerably smaller, predominates on the Karst. Smaller plates (26) were found in the majority of spits, only in each of spits 10, 12 and 14 was a larger plate found.

Bradybaena fruticum is the only snail here from the family **Brabybaenidae**. The shells of this species are smooth, rounded and slightly depressed, whitish or yellowish, occasionally also pink, transparent, up to 2.5 cm wide, with a wide umbilicus. The species is commonest in sunny positions overgrown with shrubs. A few shells were found in each of spits 11 to 18. Only in spit 15 were 8 broken shells found. One shell was found in each of the first four layers of Pečina pri Bjarču.

The family **Hygromiidae**, which is divided into several sub-families, has a very large number of species. A few broken shells of hairy snails of the genus *Trichia* in layers 2 and 3 belong to *Trichia hispida* and *Trichia leucozona*.

Monacha carthusiana lives in warm and open positions. Its slightly depressed shells are thin and transparent, and they grow to 1.5 cm. Four broken shells were found in spits 10, 14 and 15. *M. carthusiana* was also found in Pečina pri Bjarču and Stenašca.

The family **Helicidae** has a very large number of species. The commonest and most widespread is *Campylaea illyrica*. The brown, depressed and glittering shells have a diameter up to 3.5 cm. It prefers living in forested mountain world but is also found in lowlands, especially among shrubs. *Kosicia intermedia* also appears among indeterminable remains. The remains of both species were found in all three layers.

The genus *Cepaea* has three species here. *C. nemoralis* has 2.5 cm wide and up to 2 cm high shells, which are variously coloured and various underlying colours. The aperture margin and the surrounding of the umbilicus are always dark brown. The basic colour of the shell is normally yellow, but also whitish to reddish shells are found and of course a large number of intermediate colours and shades. The dark spiral bands are very variable. There are 1 to 5 of these. Three broken shells were found in spits 9, 14 and 16. It was much commoner in the excavations in Pečina pri Bjarču, but only one in fragments was found in Stenašca.

Sl. 13.3: Cecilioides acicula (1), *Campylaea illyrica* (2) in *Helix pomatia* (3). Merila so podana v mm. Foto M. Grm.
Fig. 13.3: Cecilioides acicula (1), *Campylaea illyrica* (2) in *Helix pomatia* (3). Measurements are given in mm. Photo M. Grm.

temnorjava. Osnovna barva hišice je navadno rumena, najdemo pa tudi belkaste do rdečkaste hišice in seveda veliko vmesnih barvnih prehodov in odtenkov. Zelo spremenljivi so temni spiralni pasovi. Teh je l do 5. V režnjih 9, 14, in 16 so bile 3 polomljene hišice. Veliko pogostejši je bil v izkopih v Pečini pri Bjarču, v Stenašci pa je bil ugotovljen le v fragmentih.

Veliki vrtni polž (*Helix pomatia*) je naš največji polž. Hišica je visoka do 4,5 cm in toliko tudi široka. Navadno je rjava ali sivkasta, pogosto s temnejšimi nejasnimi pasovi. Vrsta živi povsod po gozdovih in grmiščih. V Viktorjevem spodmolu se pojavlja v fragmentih v večini režnjev. Fragmentarno je bila ugotovljena tudi v Pečini pri Bjarču, medtem ko so v Stenašci našli veliko hišic pasastega vrtnega polža (*Helix cincta*). Slednji je bil najden tudi v okolici Viktorjevega spodmola, zato verjetno nekateri fragmenti pripadajo tudi tej vrsti.

V frakciji sedimenta 0,5-3 mm je bilo v vseh režnjih, razen v najglobljih, veliko drobcev polžjih hišic, ki se niso dali opredeliti.

13.3 Sklepi in diskusija
(sl. 13.4)

Viktorjev spodmol leži na zahodnem submediteranskem območju Slovenije. Neposredni vpliv na horološko razporeditev malakofavne imajo bližina Sredozemlja, dinarskega območja in vzhodnega dela Alp. V plasteh v Viktorjevem spodmolu je največ vrst, ki imajo večje areale v delih Evrope s težiščem v Sredozemlju, južni, vzhodni, zahodni ali srednji Evropi. Sledijo evropskomediteranske, srednje- in južnoevropske vrste, dinarske vrste in vzhodnoalpsko-dinarske. Zaradi bližine morja in obsežnih termofilnih pobočij, ki so obrnjena proti jugozahodu, je razmeroma velik delež mediteranskih in južnoevropskih vrst v širšem smislu.Analiza zbranega materiala potrjuje recentno malakofavno ožjega območ-

The large garden snail (*Helix pomatia*) is the largest snail here. The shell is up to 4.5 cm high and has a similar width. It is normally brown or greyish, often with darker, unclear bands. The species lives everywhere in forests and shrubs. Fragments appear in the majority of spits in Viktorjev spodmol. Fragments were also found in Pečina pri Bjarču, while in Stenašca they found a lot of shells of *Helix cincta*. The latter was also found in the vicinity of Viktorjev spodmol, so some of the fragments probably also belong to this species.

In the fraction of sediments 0.5-3 mm, there were a lot of tiny fragments of snail shells that could not be identified in all spits except the deepest.

13.3 Conclusions and Discussion
(Fig. 13.4)

Viktorjev spodmol is located in the western sub-Mediterranean region of Slovenia. The proximity of the Mediterranean, the Dinarid region and the eastern part of the Alps has a direct impact on the horological distribution of malacofauna. In the layers of Viktorjev spodmol, there are the most species which have a larger area of distribution in parts of Europe centred on the Mediterranean, southern, eastern, western or central Europe. These are followed by Euro-Mediterranean, central and southern European species, Dinarid species and eastern Alpine-Dinarid species. Because of the proximity of the sea and extensive thermophyllic slopes facing the southwest, there is a relatively large share of Mediterranean and southern European species in the wider sense. Analysis of the collected material confirms the recent malacofauna of the narrower region in which Viktorjev spodmol is located. All species found in the layers in Viktorjev spodmol inhabit the wider area of Škocjanske jame Park. We also found the majority of species in soil samples in the immediate vicinity of the overhang cave.

ja, kjer leži Viktorjev spodmol.Vse vrste, ki so bile ugotovljene v plasteh v Viktorjevem spodmolu naseljujejo širše območje Parka Škocjanske jame. Večino vrst smo našli tudi v talnem vzorcu v neposredni okolici spodmola.

Na osnovi dobljenih rezultatov lahko trdimo da sta 2. in 3. plast malakološko bogatejši od nasutja in plasti 1 in 2. To lepo odseva v številu vrst in številu hišic v posameznih režnjih (razpredelnica 13.3). Režnji od 10 do 18 so vrstno najbogatejši. V njih se pojavlja od 15 do 27 vrst. S številom vrst ne raste sorazmerno tudi število hišic (indeks 1), kar kaže na določene spremembe v prostoru.

Prisotnost rečne sadlerijane v 2. in 3. plasti in ostanka hišice malega mlakarja v 15. režnju si lahko razlagamo na več načinov. Ali so bili polži zanešeni v jamo z vodo, ki so jo tja prinašali ljudje, ali pa je v preteklosti obstajala vodna povezava. Sedaj v neposredni bližini spodmola ni ugotovljen noben izvir oz. studenec.

V Viktorjevem spodmolu so značilne vrste (neupoštevaje *Helix pomatia* ki po količini zbranih ostankov presega maso vseh drugih vrst) *Cochlostoma septemspirale* (56,29 %), *Cochlodina* fragm. (14,1 %), *Macrogastra* fragm. (10,02 %), *Granaria illyrica* (3,74 %), *Ruthenica filograna* (2,42 %), *Sadleriana fluminensis* (2,02 %), *Macrogastra plicatula* (1,20 %), *Discus perspectivus* (1,02 %) in *Chondrina avenacea* (0,9 %). Zelo podobno je stanje tudi v Pećini pri Bjarču, ki je najbližje najdišče s stratificiranimi najdbami iz epigravetjena in mezolitika (sovterjena) in ki leži na levem bregu Nadiže (*Natisone*) blizu Špetra (*San Pietro al Natisone*). Tudi tam so plasti s paleolitskimi in mezolitskimi najdbami debele približno 1 m. Nekoliko drugačne je v Stenašci, ki leži na Krasu, nedaleč od Trsta, blizu meje s Slovenijo. V izkopih v skoraj enakem številu prevladujeta vrsti *Cochlostoma septemspirale* in *Pomatias elegans*.

Od določenih 43 taksonov (vrst in podvrst) v Viktorjevem spodmolu, 34 v Stenašci in 37 v Pečini pri Bjarču je se jih 17 pojavlja v vseh treh previsih (razpredelnica 13.1).

Primerjava deleža vodilnih vrst v izkopu v Viktorjevem spodmolu in v talnem vzorcu (sl. 13.4) kaže drugačne ekološke zahteve vrst. *Cochlostoma septemspirale* je prevladujoča vrsta v spodmolu in v talnem vzorcu. Vrste, ki se pojavljajo v spodmolu z le nekaj hišicami, se redko zatekajo v zaklonjena mesta, kot so večje skale, stene, spodmoli. So izrazito talne živali.

Na podlagi določenega materiala v posameznih režnjih ni mogoče natančneje opredeliti razlik med režnji, ki so posledica temperaturnih, klimatskih, vegetacijskih in drugih sprememb, ki so se dogajale v neposredni okolici spodmola. Velikost sonde, načini zbiranje malakološkega materiala, majhnost hišic in opredeljevanje v večini primerov polomljenih hišic in njihovih ostankov ne omogočajo natančne kvalitativne in kvantitativne analize posameznih plasti v Viktorjevem spodmolu kot celostnem objektu. Veliko število ostankov hi-

On the basis of the results obtained, we can state that layers 2 and 3 are malacologically richer than the topsoil and layers 1 and 2. This is nicely reflected in the number of species in individual spits (Table 13.3). Spits from 10 to 18 are the species richest. They contain from 15 to 27 species. The number of shells does not increase in proportion to the number of species (index 1), which indicates certain changes in the space.

The presence of *Sadleriana fluminensis* in layers 2 and 3 and the remains of shells of *Galba truncatula* in spit 15 could be explained in a number of ways. The snails may have been carried into the cave with water brought by people, or water links existed in the past. No spring or water source is been found now in the immediate vicinity of the overhang cave.

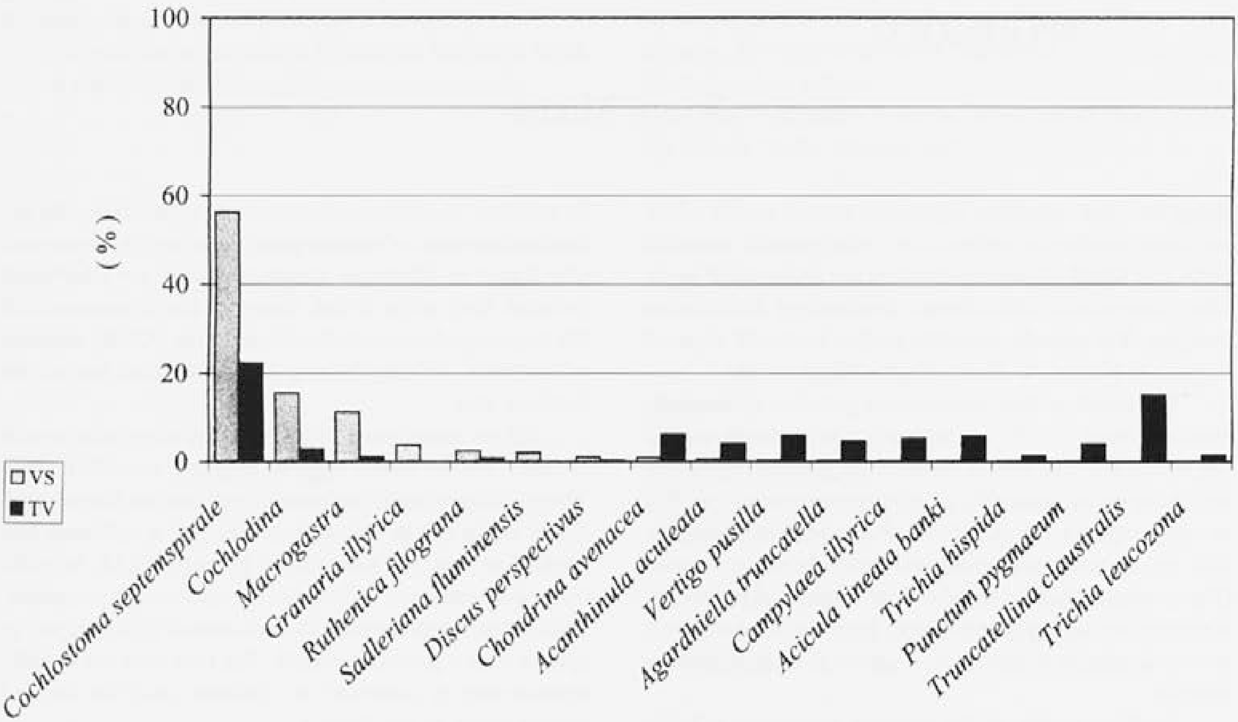
In Viktorjev spodmol, the characteristic species (not taking *Helix pomatia* into account, which in quantity of remains collected exceeds the mass of all other species) are *Cochlostoma septemspirale* (56.29 %), *Cochlodina* fragm. (14.1 %), *Macrogastra* fragm. (10.02 %), *Granaria illyrica* (3.74 %), *Ruthenica filograna* (2.42 %), *Sadleriana fluminensis* (2.02 %), *Macrogastra plicatula* (1.20 %), *Discus perspectivus* (1.02 %) and *Chondrina avenacea* (0.9 %). The situation in Pečina pri Bjarču, which is the closest site with stratified finds from the Epigravettian and Mesolithic (Sauveterrian) and which is located on the left bank of Nadiža (*Natisone*) close to Špeter (*San Pietro al Natisone*), is very similar. There, too, the layers with Palaeolithic and Mesolithic finds are approximately 1 m thick. It is slightly different in Stenašca, which is located on Kras not far from Trst (*Trieste*), close to the border with Slovenia. The species *Cochlostoma septemspirale* and *Pomatias elegans* predominate in the excavations with almost the same numbers.

Of 43 taxa (species and sub-species) identified in Viktorjev spodmol, 34 in Stenašca and 37 in Pečina pri Bjarču, 17 of them appear in all three overhang caves (Table 13.1).

A comparison of the share of leading species in the excavation in Viktorjev spodmol and in topsoil samples (Fig. 13.4) shows different ecologically demanding species. *Cochlostoma septemspirale* is the predominating species in the overhang cave and in soil samples. Species that appear in the overhang cave with only a few shells rarely creep into sheltered places such as large rocks, cliffs, overhang caves. They are explicitly soil animals.

On the basis of specific material in individual spits it is not possible to determine more precisely differences between spits, which are a result of temperature, climate, vegetation and other changes occurring in the immediate vicinity of the overhang cave. The size of the test trench, the method of collecting the malacological material, the smallness of the shells and identifying in the majority of cases broken shells and their remains do not enable exact qualitative and quantitative analysis of šic nas vodi v domnevo, da je bil lahko veliki vrtni polž umetno zanesen v jamo in je služil kot vir hrane.

individual layers in Viktorjev spodmol as an overall object. The large number of remains of the *Helix pomatia* give rise to the suspicion that it may have been artificially brought into the cave and served as a food source.



Sl. 13.4: Primerjava deleža vodilnih vrst v Viktorjevem spodmolu (VS) in v v talnem vzorcu (TV).
Fig. 13.4: Comparison of shares of leading species in Viktorjev spodmol (VS) and in topsoil samples (TV).

Zahvala:

Ivan Turk in Janez Dirjec sta skrbno izločila iz vzorcev polžje hišice in njihove ostanke ter mi jih izročila v obdelavo, za kar sem jima zelo hvaležen. Za nasvete in pomoč pri opredeljevanju se najtopleje zahvaljujem dr. Marii Manueli Giovannelli iz Prirodoslovnega muzeja v Udinah (Museo Friulano di Storia Naturale). Za tehnično pomoč pa gre zahvala Janji Valentinčič.

Acknowledgement:

Ivan Turk and Janez Dirjec carefully separated the snail shells and their remains from the sample and gave them to me for processing, for which I am very grateful. I would like warmly to thank Dr. Maria Manuela Giovannelli from Museo Friulano di Storia Naturale in Udine for advice and help in identification. I am grateful to Janja Valentinčič for technical help.

VIKTORJEV SPODMOL

13.4. DODATEK: MORSKI POLŽI IN ŠKOLJKE V VIKTORJEVEM SPODMOLU

13.4. APPENDIX: MARINE GASTROPODS AND BIVALVES IN VIKTORJEV SPODMOL

VASJA MIKUŽ

Poleg številnih ostankov kopenskih polžev so bili v Viktorjevem spodmolu najdeni tudi redki ostanki morskih polžev in školjk. Ti so pomembni, ker dokazujejo povezave prebivalcev Viktorjevega spodmola z Jadranskim morjem. Vsi ostanki morskih polžev in školjk namreč pripadajo vrstam, ki živijo v Jadranskem morju.

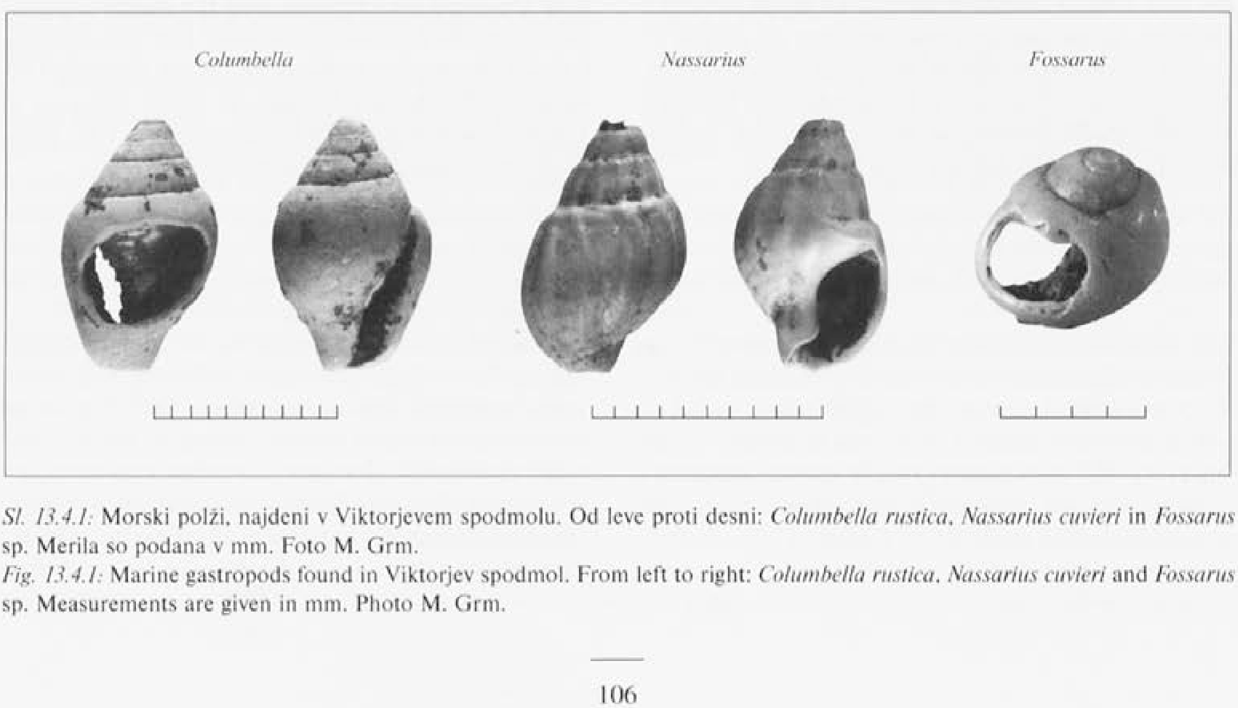
Od šestih polžev pripadajo 4 golobici *Columbella rustica* (Linné, 1758), ki živi v plitvem obalnem morju. Od teh so bili trije preluknjani, en pa je tako fragmentiran, da se ne da ugotoviti, ali je bil preluknjan ali ne. Vsi so bili najdeni v režnjih 12–14. Poleg tega je bil najden tudi po en primerek 'cuvierove vrše' *Nassarius cuvieri* (Payraudeau, 1826) v režnju 11 in 'kopača' *Fossarus* sp. v režnju 14 s preluknjano hišico. Prvi živi na peščenem dnu in je pogost v plitvinah, drugi pa med kamenjem v litoralu.

Školjčne lupine so bile najdene v različnih režnjih. V režnju 6 en majhen nerazpoznaven del lupine, v režnju 7 dva nerazpoznavna fragmenta lupine, v režnju 8 en nerazpoznaven del lupine, v režnju 10 trije nerazpoznavni deli lupin in en fragment školjke rodu *Mytilus*, v režnju 11 pet nerazpoznavnih fragmentov lupin, v režnju 13 šest nerazpoznavnih fragmentov lupin, v režnju 15 trije nerazpoznavni fragmenti lupin, v režnju 16 en večji frag-

In addition to numerous remains of land snails, the occasional remains of marine gastropods and bivalves were also found in Viktorjev spodmol. These are important because they show a link between the inhabitants of Viktorjev spodmol and the Adriatic Sea. All the remains of seashells, namely, belong to species that live in the Adriatic Sea.

Of six gastropods, 4 belong to *Columbella rustica* (Linné, 1758), which lives in shallow coastal waters. Three of them were perforated, and one so fragmented that it could not be established whether it had been perforated or not. All were found in spits 12–14. In addition one specimen of *Nassarius cuvieri* (Payraudeau, 1826) was found in spit 11 and one of *Fossarus* sp. in spit 14 with a perforated shell. The first lives on a sandy bottom and is common in shallows, and the second among rocks in the littoral.

Mussel shells were found in various spits. In spit 6 a small unrecognisable part of a shell, in spit 7 two unrecognisable fragments of shell, in spit 8 one unrecognisable part of a shell, in spit 10 three unrecognisable parts of shells and a fragment of mussel of the genus *Mytilus*, in spit 11 five unrecognisable fragments of shell, in spit 13 six unrecognisable fragments of shell, in spit 15 th-



Sl. 13.4.1: Morski polži, najdeni v Viktorjevem spodmolu. Od leve proti desni: *Columbella rustica*, *Nassarius cuvieri* in *Fossarus* sp. Merila so podana v mm. Foto M. Grm.

Fig. 13.4.1: Marine gastropods found in Viktorjev spodmol. From left to right: *Columbella rustica*, *Nassarius cuvieri* and *Fossarus* sp. Measurements are given in mm. Photo M. Grm.

ment lupine, ki pripada užitni klapavici *Mytilus galloprovincialis* Lamarck, 1819. Najdba predstavlja spodnji del sklepnega roba desne lupine. Omenjena vrsta je v Jadranskem morju med školjkami najbolj razširjena. Živi ob morskih obalah v coni bibavice, izjemoma do globine 4 m, in ob ustjih rek. V režnju 19 sta bila najdena dva nerazpoznavna fragmenta školjčne lupine.

Najverjetneje pripadajo fragmenti školjčnih lupin v vseh režnjih vrsti, ki je ugotovljena v režnju 16.

ree unrecognisable frgaments of shell, in spit 16, one larger fragment of shell belonging to the edible Blue Mussel *Mytilus galloprovincialis* Lamarck, 1819. The find represents the lower part of the right shell. The mentioned species is among the most widespread mussels in the Adriatic Sea. It lives by the sea coast in the tidal zone, exceptionally to a depth of 4 m, and by river mouths. Two unrecognisable fragments of mussel shells were found in spit 19.

The fragments of mussel shells in all spits probably belong to the species identified in spit 16.

14. Ostanki ektotermnih vretenčarjev v Viktorjevem spodmolu

14. Remains of Ectothermic Vertebrates in Viktorjev Spodmol

Maja Paunović†

Pri pregledovanju mokro presejanih sedimentov sondiranja Inštituta za arheologijo ZRC SAZU - faza IzA (frakcije, manjše od 3 mm), so bili med drugim pobrani tudi številni ostanki ektotermnih vretenčarjev. Vse najdbe so bile dokumentirane po režnjiih, ločeno za levi in desni del odkopanega profila. Ker lokacija teh najdb v tako majhnem tlorisu ni pomembna, sem pri analizi upoštevala samo porazdelitev najdb v režnjih oziroma njihovo stratigrafijo, ne pa tudi porazdelitve v tlorisu. Pri stratigrafski analizi sem upoštevala izključno plasti, ki sem jih po navodilih I. Turka korelirala z režnji. Pri tem plast 1 dejansko predstavlja nasutje do globine -259 cm (reženj 1 in 2), preostale plasti pa predstavljajo naravno sedimentacijo.

Plast 1/2 združuje režnje 3-5 in sega do globine -274 cm, plast 2 združuje režnje 6-14 in sega do globine -319 cm, plast 3 pa združuje režnje 15-19 in sega do dna sonde na globini -353 cm (glej Turk, sl. 5.1, ta zbornik).

Med drugimi drobnimi ostanki (glej Culiberg, ta zbornik; Slapnik, ta zbornik in Toškan & Kryštufek, ta zbornik) je bilo analiziranih več kot 5.000 ostankov ektotermnih vretenčarjev, različno porazdeljenih v režnjih in plasteh.

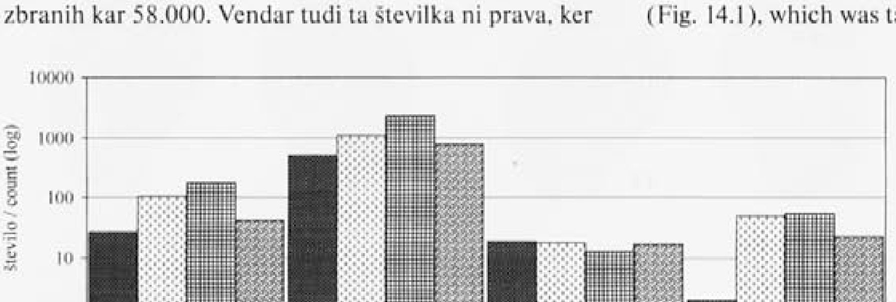
Med skeletnimi deli prevladujejo vretenca (ok. 80 %), sledijo lobanjske kosti (ok. 10 %). Drugi postkranialni deli skeleta in luske (*squamae*) so relativno slabo zastopani v analiziranem vzorcu (sl. 14.1), ki je bil vzet iz 0,3 m^3 sedimenta. Pri tem je treba pripomniti, da je bil v analizo vključen le neznaten del lusk, saj je bilo teh zbranih kar 58.000. Vendar tudi ta številka ni prava, ker

During the examination of the wet sieved sediments of the test trench of the Institute of Archaeology ZRC SAZU - IzA phase (fraction smaller than 3 mm) among other things numerous remains of ectothermic vertebrates were collected. All finds were documented by spits, separately for the left and the right parts of the excavated profile. Because the location of these find is not important on a small ground area, I only took into account in the analysis the distribution of the finds in spits, or their stratigraphy, and not also their distribution on the ground plan. In the stratigraphic analysis, I took into account exclusively layers, which I correlated with spits according to the instructions of I. Turk. In this, layer 1 actually represents artificially redeposited sediments to a depth of -259 cm (spits 1 and 2), and the remaining layers represent natural sedimentation.

Layer 1/2 unites spits 3-5 and extends to a depth of -274 cm, layer 2 unites spits 6-14 and extends to a depth of -319 cm, and layer 3 unites spits 15-19 and extends to the bottom of the trench to a depth of -353 cm (see Turk, Fig. 5.1, this volume).

Among other very small remains (see Culiberg, this volume; Slapnik, this volume and Toškan & Kryštufek, this volume), more than 5000 remains of ectothermic vertebrates were analysed, variously distributed in spits and layers.

Vertebrae predominated among skeletal parts (cca. 80%), followed by cranial bones (cca 10%). Other postcranial parts of the skeleton and osteoscutes (*squamae*) are relatively poorly represented in the analysed sample (Fig. 14.1), which was taken from 0.3 m^3 of sediment. It



	cranium	vertebrae	postcranium	squamae
1	27	513	19	2
1/2	105	1089	18	50
2	175	2312	13	55
3	42	784	17	23

Sl. 14.1: Številčna zatopanost skeletnih delov in lusk ektotermnih vretenčarjev v plasteh 1, 1/2, 2 in 3.

Fig. 14.1: Numerical representation of skeletel parts and osteoscutes of ectothermic vertebrates in layers 1, 1/2, 2 and 3.

vse niso bile pobrane. Največ (20.000) jih je bilo v plasti 1/2.

Identifikacijo ostankov sem izvedla s primerjanjem recentnega gradiva v zbirki *Zavoda za paleontologiju i geologiju Kvartara* (Zagreb) in z uporabo ključev za določevanje (Bachmayer & Mlinarsky 1977, Paunović 1991, Rauscher 1992, Szyndlar 1984, Torke 1981). Zaradi velikega števila močno poškodovanih vretenc in lobanjskih kosti (posebno zgornjih čeljustnic in dentale) sem lahko analizirala približno 90 % gradiva. V mnogih primerih je bila določitev dvomljiva, ali pa je bila možna samo na višjem taksonomskem nivoju.

A) RIBE (PISCES)

Med pobranimi ostanki ektotermnih vretenčarjev je bilo samo 30 ostankov rib (sl. 14.2). Vsi so fragmentarni, tako da sem lahko samo en žrelni zob pripisala klenu *Squalius*. Vendar vsi fragmenti nedvomno pripadajo skupini sladkovodnih rib, najverjetneje krapovcem (Cyprinidae).

B) DVOŽIVKE (AMPHIBIA)

Ostanki doživk so v majhnem številu enakomerno razporejeni po vseh plasteh (sl. 14.3). Relativno veliko je (pravih) žab (30), medtem ko sta samo dva ostanka krastač. Zaradi slabe ohranjenosti ostankov sem lahko 16 kosti določila samo kot Amphibia in/ali Caudata (repate dvoživke). Štiri postkranialne kosti sem pripisala močeradu (*Salamandra* sp.).

C) KUŠČARICE (LACERTILIA)

V analizirani fosilni združbi, predvsem v plasti 2, prevladuje slepec (*Anguis fragilis*) s 1267 ostanki, ki pripadajo značilnim zobnim kostem, luskam in vretencem (sl.

should be noted that only an insignificant part of the osteoscutes was included in the analysis, since some 58,000 of these were collected. However, even this number is not correct, since not all were collected. There were the most (20,000) in layer 1/2.

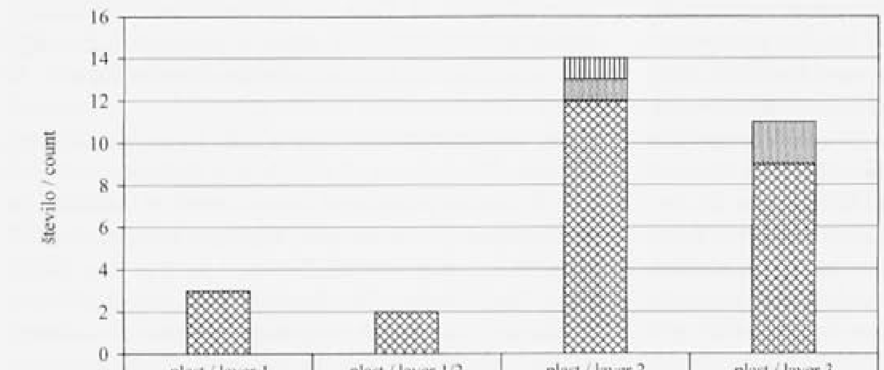
I performed identification of the remains by comparison with recent material in the collection of the *Institute of Quaternary Palaeotology and Geology* (Zagreb) and by use of an identification key (Bachmayer & Mlinarsky 1977, Paunović 1991, Rauscher 1992, Szyndlar 1984, Torke 1981). Because of the large number of greatly damaged vertebrae and cranial bones (especially the upper jaw and dentale) I could only analyse about 90% of the material. In many cases, the decision was suspect or was only possible on a higher taxonomic level.

A) FISH (PISCES)

Among the remains of ectothermic vertebrates collected, there were only 30 remains of fish (Fig. 14.2). All are fragmentary, so that I could only ascribe one tooth to *Squalius*. However, all the fragments undoubtedly belong to the group of freshwater fish, probably cyprinids (Cyprinidae).

B) AMPHIBIANS (AMPHIBIA)

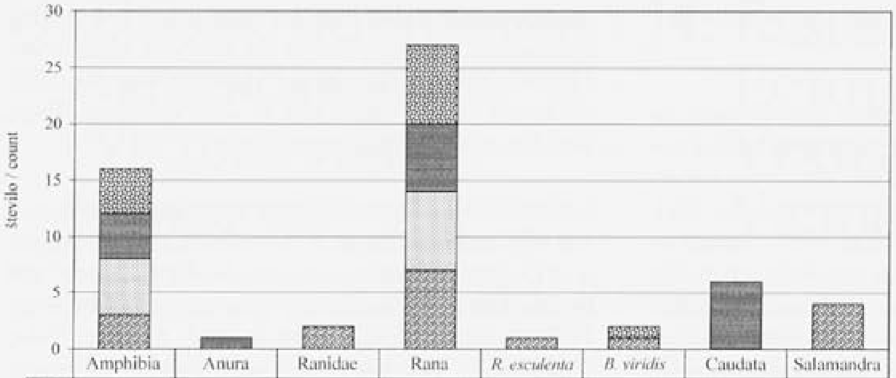
The remains of amphibians were equally distributed in small numbers through all layers (Fig. 14.3). There were a relatively high number of (common) frog (30), but only two remains of toad. Because of the poor state of preservation of the remains, 16 bones could only be identified as Amphibia and/or Caudata (tailed amphibians). I ascribed four post-cranial bones to Salamander (*Salamandra* sp.).



	plast / layer 1	plast / layer 1/2	plast / layer 2	plast / layer 3
Squalius			1	
Cyprinidae			1	2
Pisces	3	2	12	9

Sl. 14.2: Absolutni deleži določljivih in nedoločljivih rib v plasteh 1, 1/2, 2 in 3.
Fig. 14.2: Absolute shares of identifiable and unidentifiable fish in layers 1, 1/2, 2 and 3.

VIKTORJEV SPODMOL



	Amphibia	Anura	Ranidae	Rana	*R. esculenta*	*B. viridis*	Caudata	Salamandra
3	4			7		1		
2	4	1		6			6	
1/2	5			7				
1	3		2	7	1	1		4

Sl. 14.3: Absolutni deleži določljivih in nedoločljivih dvoživk v plasteh 1, 1/2, 2 in 3.
Fig. 14.3: Absolute shares of identifiable and unidentifiable amphibians in layers 1, 1/2, 2 and 3.

14.4). Poleg številnih ostankov (2154), ki sem jih določila samo kot ostanke kuščarjev, je tudi veliko najdb (223) rodu *Lacerta* (predvsem martinček *L. agilis*). Samo ena kost v plasti 1 pripada rodu *Tarentola* (gekon) in ena v plasti 2 rodu *Agama* (hardun).

V delu presejanega sedimenta sonde Viktorjevega spodmola (faza Viktor in IzA) so bili najdeni še štirje koščeni fragmenti (dentale, verjetno pa tudi zgornja čeljustnica), vsi s plevrodontnimi zobmi, ki jih je B. Kryštufek pripisal vrsti *Lacerta cf. viridis* (zelenec).

Viktorjev spodmol je izjemen zaradi najdb dermalnih ploščic slepca. Teh je na tisoče v vsakem režnju, predvsem pa v mezolitskih režnjih.

D) KAČE (SERPENTES)

V vzorcu so bila najdena tudi kačja vretenca, in sicer v vseh plasteh (sl. 14.5). Pripadajo gožem (*Natrix* - belouška in/ali kobranka, *Elaphe* - gož in/ali njegovi sorodniki), ki najraje živijo ob vodi. Modras (*Vipera ammodytes*) je zastopan z enim vretencem, najdenim v plasti 1.

V plasti 1 so bili 3 ostanki rib, 18 ostankov dvoživk, 256 ostankov kuščarjev in 20 ostankov kač. Tri zelo poškodovane kosti sem lahko pripisala neopredeljenim sladkovodnim ribam. Osemnajst kostnih ostankov dvoživk sem določila takole: 2 kot prave žabe (Ranidae), 7 kot *Rana* sp., 1 kot zelena žaba (*Rana esculenta*), 1 kot zelena krastača (*Bufo viridis*) in 1 kot *Salamandra* sp. Natančneje nedoločljive so bile 3 kosti dvoživk. Kosti kuščarjev pripadajo v 249 primerih slepcu (*Anguis fragilis*), v enem primeru gekonu (*Taremtola*), v 46 primerih martičku (*Lacerta agilis*) v 35 primerih *Lacerta* sp. in v 174 primerih neopredeljenim kuščarjem. Kačja vretenca pripadajo v enem primeru modrasu (*Vipera ammodytes*), v dveh primerih progastemu gožu (*Elaphe quatuorlineata*), v 3 primerih navadnemu gožu (*E. longissima*),

C) LIZARDS (LACERTILIA)

In the analysed groups of fossil, mainly in layer 2, slowworm (*Anguis fragilis*) predominated with 1267 remains which belong to characteristic teeth bones, osteoscutes and vertebrae (Fig. 14.4). In addition to numerous remains (2154), which I identified only as remains of lizards, there were also a large number of finds (223) of the genus *Lacerta* (mostly sand lizard *L. agilis*). A single bone in layer 1 belongs to the genus *Tarentola* (geckos) and one in layer 2 to the genus *Agama* (agamids).

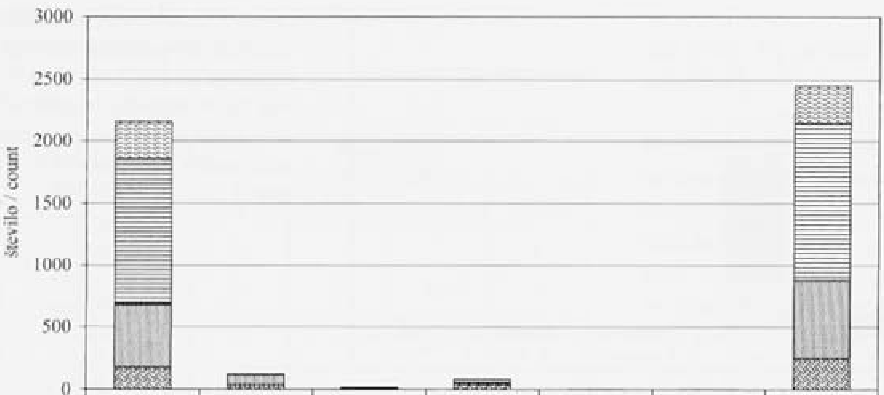
Four bone fragments (dentale, probably also upper jaw) were found in part of the sieved sediments of the test trench of Viktorjev spodmol (Viktor and IzA phase), all pleurodontic teeth, which B. Kryštufek ascribed to the species *Lacerta cf. viridis* (green lizard).

Viktorjev spodmol is exceptional because of the find of dermal plates of slow-worm. There were thousands of these in each spit, above all in the Mesolithic spits.

D) SNAKES (SERPENTES)

Vertebrae of snakes were also found in the sample, in all layers (Fig. 14.5). They belong to colubrids (*Natrix, Elaphe*), that like to live by water. Viper (*Vipera ammodytes*) is represented by one vertebra, found in layer 1.

Layer 1 contained 3 remains of fish, 18 remains of amphibians, 256 remains of lizards and 20 remains of snakes. Three very damaged bones could be ascribed to unidentified freshwater fish. Eighteen bone remains of amphibians were identified thus: 2 as true frog (Ranidae), 7 as *Rana* sp., 1 as common European frog (*Rana esculenta*), 1 as European green toad (*Rana esculenta*) in 1 as salamander (*Salamandra* sp.) Three bones of amphibians were not identifiable more exactly. Bones of lizards belong in 249 cases to slow-worm (*Anguis fragilis*), in one case to gecko (*Taremtola*), in 46 cases to



	Lacertilia	Lacerta	*L. viridis*	*L. agilis*	Agama	Tarentola	Anguis
3	302		2	2			306
2	1174	3	8	26	1		1267
1/2	504	83	9	9			627
1	174	35		46		1	249

Sl. 14.4: Absolutni deleži določljivih in nedoločljivih kuščaric v plasteh 1, 1/2, 2 in 3.
Fig. 14.4: Absolute shares of identifiable and unidentifiable lizards in layers 1, 1/2, 2 and 3.

v 6 primerih *Natrix* sp., v 7 primerih belouški (*Natrix natrix*) in v enem primeru neopredeljeni kači.

V plasti 1 so bile tako enakovredno zastopane evropske in evroazijske vrste.

V mešani plasti 1-2 sem ugotovila samo 2 ribji vretenci. Dvoživke so bile predstavljene s 7 kostmi, ki pripadajo *Rana* sp. in s 7 ostanki, ki se niso dali natančneje taksonomsko opredeliti. Med številnimi poškodovanimi ostanki kuščarjev jih 627 pripada slepcu (*Anguis fragilis*), 83 *Lacerta* sp., 9 zelencu (*L. viridis*), 9 martinčku (*L. agilis*), 504 pa je bilo tako poškodovanih, da se niso dali opredeliti.

Tudi v tej plasti so zastopane tako evropske kot evrazijske vrste.

V plasti 2 sem od skupno 14 ostankov rib en zob pripisala klenu (*Squalius* sp.), enega krapovcem (Cyprinidae), medtem ko sem 12 fragmentarno ohranjenih ostankov lahko pripisala le sladkovodnim ribam. Ostanki dvoživk pripadajo v 6 primerih repatim dvoživkam (Caudata), v 6 primerih *Rana* sp., v enem primeru brezrepim dvoživkam (Anura) in v 4 primerih zgolj dvoživkam. Največ je kuščarjev: 1267 fragmentiranih ostankov pripada slepcu (*Anguis fragilis*), en hardunu (*Agama* sp.), 3 pravim kuščaricam (*Lacerta* sp.), 26 martinčku (*L. agilis*), 8 zelencu (*L. viridis*), 1174 ostankov kuščarjev pa nisem mogla opredeliti. Med ostanki redkih kač sta belouška in/ali kobranka (*Natrix* sp.) zastopani s 25 in goži (*Elaphe* sp.) s 34 vretenci, 51 kačjih vretenc pa se niso dali opredeliti.

Tudi za to plast so značilni številni ostanki plazilcev, z verjetno evropskimi biogeografskimi značilnostmi.

Med manj številnimi ostanki v plasti 3 jih dvoje pripada krapovcem (Cyprinidae), 9 neopredeljenim sladkovodnim ribam, 7 pravim žabam (*Rana* sp.), 1 zeleni krastači (*Bufo viridis*) in 4 neopredeljenim dvoživkam. Ostanki kuščarjev so še vedno dokaj številni: 306 fragmentiranih ostankov pripada slepcu (*Anguis fragilis*), 2

sand lizard (*Lacerta agilis*) in 35 cases to *Lacerta* sp. and in 174 cases to unidentified lizards. Vertebrae of snakes belong in one case to viper (*Vipera ammodytes*), in two cases to four-lined snake (*Elaphe quatuorlineata*), in 3 cases to Aesculapian snake (*E. longissima*), in six cases to *Natrix* sp., in 7 cases to grass snake (*Natrix natrix*) and in one case an unidentified snake.

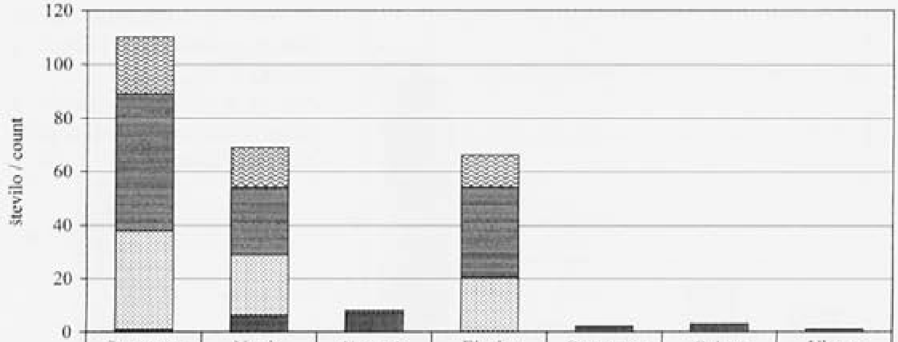
European and Euroasian species were equally represented in layer 1.

In the mixed layer 1-2 I ascertained only 2 fish vertebrae. Amphibians were represented with 7 bones belonging to *Rana* sp. and 7 that could not be more exactly identified taxonomically. Among thre numerous damaged remains of lizards, 627 belonged to slow-worm (*Anguis fragilis*), 83 to *Lacerta* sp., 9 to European green lizard (*L. viridis*), 9 to sand lizard (*L. agilis*), and 504 were so damaged that they could not be identified.

In this layer, too, both European and Euroasian species were represented.

In layer 2, of a total of 14 remains of fish, I ascribed one tooth to dace (*Squalius* sp.), one to cyprinids (Cyprinidae), while I could only ascribe 12 fragmentarily preserved remains to freshwater fish. Remains of amphibians belong in 6 cases to tailed amphibians/salamanders (Caudata), in six cases to *Rana* sp., in one case to the order of frogs and toads (Anura) and in 4 cases only to amphibians. There were most lizards: 1267 fragmentary remains of slow-worm (*Anguis fragilis*), one agamid (*Agama* sp.), 3 true lizard (*Lacerta* sp.), 26 sand lizard (*L. agilis*), 8 European green lizard (*L. viridis*), and I was unable to identify 1174 lizard remains. Among the remains of occasional snakes, there were 25 remains of grass snake and/or dice snake (*Natrix* sp.), 34 vertebrae of rat snake (*Elaphe* sp.), and 51 snake vertebrae could not be identified.

Numerous remains of reptiles with probable European biogeographic characteristics are also typical of this layer.



	Serpentes	Natrix	*N. natrix*	Elaphe	*E. quatuor*	*E. long.*	Vipera
3	21	15		12			
2	51	25		34			
1/2	37	23	1	20			
1	1	6	7		2	3	1

Sl. 14.5: Absolutni deleži določljivih in nedoločljivih kač v plasteh 1, 1/2, 2 in 3.
Fig. 14.5: Absolute shares of identifiable and unidentifiable snakes in layers 1, 1/2, 2 and 3.

zelencu (*Lacerta viridis*) in 2 martinčku (*L. agilis*), 302 ostanka kuščarjev pa se nista dala natančneje opredeliti. Oseminštirideset kačjih vretenc pripada v 15 primerih belouški in/ali kobranki (*Natrix* sp.) in v 12 primerih gožem (*Elaphe* sp.), preostalo ni bilo opredeljivo.

Najdbe v plasti 3 so evropskega značaja.

Sestav fosilnih najdb iz Viktorjevega spodmola je težko opredeliti iz dveh razlogov: 1.) zaradi anatomsko/osteoloških značilnosti ektotermnih vretenčarjev in 2.) zaradi dejstva, da se je v sedimentih ohranil le manjši del njihovih skeletnih ostankov. V analiziranem vzorcu prevladujejo ostanki, ki sem jih pripisala višjim taksonomskim kategorijam rib, dvoživk, kuščarjev in kač ali njihovim rodovom. Te ostanke predstavljajo predvsem vretenca, ki so dejansko najštevilnejša (predvsem repna) pri kuščarjih in kačah. Zaradi tega je zelo težko oceniti najmanjše število osebkov (NŠO) ektotermnih vretenčarjev po plasteh ali kako drugače. Če ga ocenim na podlagi števila in oblike lobanjskih kosti, dobim relativno nizke številke (27 za plast 1, 105 za plast 1-2, 175 za plast 2 in 42 za plast 3). Če ga ocenim na podlagi števila vretenc - pri katerih ni mogoče ugotoviti, ali pripadajo istim osebkom - je lahko najmanjše število kač in kuščarjev v plasti 1 tudi 513, 1089 v plasti 1-2, 2312 v plasti 2 in 784 v plasti 3. Te številke so precenjene, kajti, če v oceni izhajam tudi iz postkranilanih ostankov (dolge kosti), postane jasno, da je najmanjše število osebkov pri kačah in kuščarjih 19 v plasti 1, 18 v plasti 1-2, 13 v plasti 2 in 17 v plasti 3.

Dejansko najmanjše število osebkov je nekje vmes med najnižjim in najvišjim številom analiziranih najdb. Njegova ocena je mogoča izključno na podlagi točno določenih najdb (razpredelnica 14.1).

Izhajajoč iz rezultatov določitve in analize najdb nižjih vretenčarjev, pripada večina ostankov v vseh raziskanih nivojih slepcem (Anguidae), ki so dominantna vrsta v najdišču. Druge vrste so zastopane z relativno majhnim številom ostankov.

Among the less numerous remains in layer 3, two belong to cyprinids (Cyprinidae), 9 to unidentified freshwater fish, 7 to true frogs (*Rana* sp.), 1 to European green toad (*Bufo viridis*) and 4 to unidentified amphibians. The remains of lizards are still fairly numerous: 306 fragmented remains of slow-worm (*Anguis fragilis*), 2 green lizard (*Lacerta viridis*) and 2 sand lizard (*L. agilis*), and 302 lizard remains could not be identified more exactly. Forty-eight snake vertebrae belong in 15 cases to *Natrix* sp. and in 12 cases to rat snake (*Elaphe* sp.), the remainder being unidentifiable.

Finds in layer 3 are of a European character.

The composition of fossil finds from Viktorjev spodmol is difficult to define for two reasons: 1.) because of the anatomic/osteological characteristics of ectothermic vertebrates and 2.) because only smaller parts of their skeletal remains have been preserved in the sediments. Remains predominate in the analysed sample that I ascribed to higher taxonomic categories of fish, amphibian, lizards and snakes or their genuses. These remains are mainly of vertebrae, which are actually the most numerous (mainly tail) with lizards and snakes. Because of this it is very difficult to assess the minimum number of individuals (MNI) of ectothermic vertebrates by layers or in any other way. If I estimate them on the basis of the number and form of cranial bones, I get a relatively low number (27 for layer 1, 105 for layer 1-2, 175 for layer 2 and 42 for layer 3). If I estimate them on the basis of the number of vertebrae - in which it is impossible to ascertain whether they belong to the same individual - the smallest number of snakes and lizards is 513 in layer 1, 1089 in layer 1-2, 2312 in layer 2 and 784 in layer 3. These numbers are exaggerated, since if in the assessment I also derive from post-cranial remains (long bones) it becomes clear that the smallest number of individuals of snakes and lizards is 19 in layer 1, 18 in layer 1-2, 13 in layer 2 and 17 in layer 3.

The actual minimum number of individuals is some-

Razpredelnica 14.1: Viktorjev spodmol, ocenjeno najmanjše število osebkov (NŠO).
Table 14.1: Viktorjev spodmol, assessment of the minimum number of individuals (MNI).

Ostanki Remains	Plast (NŠO) Layer (MNI)			
	1	1-2	2	3
Ribe Fish	-	-	2	2
Dvoživke Amphibians	11	7	12	8
Kuščarji Lizards	29	64	130	31
Kače Snakes	13	43	59	27
SKUPAJ TOTAL	53	114	205	71

Takšno akumulacijo ostankov slepca lahko razložimo predvsem z njegovim načinom življenja (Lapini *et al.* 1999). V toplih in sušnih obdobjih leta bi slepci namreč lahko našli potrebno senco in vlago v Viktorjevem spodmolu. Znano je, da slepci prezimujejo v obstoječih votlinah in rovih, dolgih približno 1 m, 30–70 cm globoko pod zemljo. Zato so njihovi ostanki nekoliko mlajši od sedimentov in drugih najdb ter arheoloških ostankov v plasteh Viktorjevega spodmola. Številni skeletni ostanki, raztreseni v vseh arheoloških nivojih kažejo, da so slepci veliko generacij uporabljali isti bivalnozimovalni prostor, da so avtohton element v fosilni združbi Viktorjevega spodmola in da so v bližini obstajali vlažni travniki in gozd.

Drugače je z ribami, močeradi, kačami in kuščarji. Na podlagi ohranjenosti in števila ostankov lahko sklepam, da so alohtoni in da predstavljajo ostanke plena ujed in/ali drugih plenilcev. Posredno dokazujejo tudi mešanico različnih okolij v bližini najdišča: listnatega gozda in zaplat odprtih kamnišč ali vlažnih predelov (močvirje, rečna dolina itd.) s podobno, če ne enako mikroklimo, kot je danes. V Sloveniji se je bukovim gozdovom namreč že v začetku atlantske dobe pridružila jelka (faza *Abieti-Fagetum*) in od tedaj dalje je bukovjelov gozd dominanten (Šercelj 1996). Takšna gozdna vegatacija je tudi omogočila preživetje opisanih skupin ektotermnih vretenčarjev od mezolitika oz. atlantika do danes.

Zahvala:

Urednik tega zbornika se zahvaljuje Borisu Kryštufeku za pomoč pri urejanju prispevka pokojne Maje Paunović, ki žal ni mogla več sodelovati pri pripravi svojega rokopisa za tisk.

where in between the lowest and highest number of analysed finds. Its estimate is only possible on the basis of exactly identified finds (Table 14.1).

Deriving from the results of identifiaction and analysis of finds of lower vertebrates, the majority of the remains in all investigated layers belong to Anguidae (lateral-form lizards, slow worms, glass snakes), which are the dominant species at the site. Other species are represented by relatively small numbers of remains.

Such an accumulation of the remains of slow-worm can be explained mainly by its way of life (Lapini et al. 1999). In warm, dry periods of the year, slow-worms could find the necessary shade and moisture in Viktorjev spodmol. It is known that slow-worms overwinter in existing cavities and tunnels about 1 m long, 30–70 cm below the surface. Their remains are therefore rather more recent than the sediments and other finds and archaeological remains in the layers of Viktorjev spodmol. The numerous skeletal remains scattered in all archaeological layers show that many generations of slow-worms used the same hibernation quarters, that they are an autochthonous element in the fossil accumulation of Viktorjev spodmol and that they remained in the vicinity of damp meadows and forest.

It is a different case with fish, salamanders, snakes and lizards. On the basis of the state of preservation and number of remains, I can conclude that they are alochthonous and that they represent the remains of captured prey of birds of prey and/or other predators. Indirectly they also show a mixture of various environments in the vicinity of the site: deciduous forest and patches of open stonefields or damp parts (swamps, river valleys, etc.) with a similar but not the same microclimate as today. In Slovenia, namely, fir had already joined the beech forests at the start of the Atlantic period (*Abieti-Fagetum* phase) and from then on fir-beech forest was dominant (Šercelj 1996). Such forest vegetation also enabled the survival of the described groups of ectothermic vertebrates from the Mesolithic, or Atlantic, until today.

Acknowledgement:

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15. Ostanki malih sesalcev (Insectivora, Chiroptera, Rodentia) v Viktorjevem spodmolu

15. Small Mammals (Insectivora, Chiroptera, Rodentia) in Viktorjev spodmol

Borut Toškan & Boris Kryštufek

Med arheološkim sondiranjem na najdišču Viktorjev spodmol pri Škocjanskih jamah se je, poleg drugega, nabralo veliko ostankov malih sesalcev. Sonda je, sodeč po arheoloških najdbah, zajela obdobje kastelnovjena (pribl. 8600 do pribl. 7400 let pred sedanjostjo) in posteneolitsko prazgodovinsko obdobje (Turk, ta zbornik). Po zaslugi arheološko razmeroma dobro datiranih mezolitskih režnjev izkopani material omogoča dober vpogled v strukturo združbe malih sesalcev starejšega holocena, ko človekov vpliv na okolje domnevno še ni bil močan. Vsaj do nivoja rodu je bilo mogoče določiti 3.543 ostankov (razpredelnica 15.1). Z največjim deležem so zastopani glodalci (92,3 %), medtem ko predstavlja sedem določljivih primerkov netopirjev komaj 0,2 % vseh determiniranih fragmentov. V vzorcu so zastopane izključno recentne vrste, od katerih jih večina še vedno naseljuje območje Slovenije (čeprav ne nujno tudi okolico Viktorjevega spodmola). V tem pogledu so izjeme dinarska voluharica (*Dinaromys bogdanovi*), sredozemski krt (*Talpa caeca*) in sivi hrček (*Cricetulus migratorius*). V prispevku podajamo ključne izsledke analize ostankov malih sesalcev iz Viktorjevega spodmola. Bolj poglobljen vpogled, s celotnim seznamom determiniranih ostankov in njihovih meritev vred, pa podaja Toškan (2002).

Viktorjev spodmol (znan tudi kot Podjamca) pri Škocjanskih jamah (415 m n.m.v.) je ostanek večjega podrtega jamskega sistema reke Reke. Leži v submediteranskem območju Slovenije, na samem severozahodnem robu Balkanskega polotoka. Poglavitni dejavnik akumulacije ostankov malih sesalcev so bile najverjetneje sove. Sestava vzorca tako odseva preferenco plenilca do posameznih kategorij plena (Andrews 1990).

Subfosilni ostanki malih sesalcev so bili pridobljeni med tretjo, zadnjo fazo izkopavanj (faza IzA), ko je bilo izvedeno mini stratigrafsko izkopavanje s pravokotnikom 0,2 x 2 m kot osnovno enoto in režnji debeline 5 cm (glej Turk, ta zbornik). V celoti je bilo izkopanih 19 takšnih enot (režnjev oz. izkopov). Sediment je bil v celoti spran skozi sita z velikostjo luknjic 3 mm, 1 mm in 0,5 mm. Ostanki malih sesalcev so bili pobrani iz sedi-

The archaeological probe excavations at Viktorjev spodmol near the caves Škocjanske jame (south-western Slovenia) resulted, among others, also in rich material of small mammals. The probe covers the Castelnovian (*ca.* 8,600 to *ca.* 7,400 yr. BP) to the post-Eneolithic Prehistory (Turk, this volume). Archaeologically reasonably reliable stratigraphy of the Mesolithic layers enabled a deeper insight into a small mammal assembly at the beginning of the Holocene, when human impact on the environment was presumably still weak. No less than 3,543 remnants were determined to at least the generic level (Table 15.1). Rodents strongly predominated (= 92.3 %), while bats, on the other hand, were represented by merely seven fragments (= 0.2 %). Only recent species were found and majority of them still occur in Slovenia, albeit not necessarily in the vicinity of Viktorjev spodmol. Notable exceptions are Martino's vole (*Dinaromys bogdanovi*), blind mole (*Talpa caeca*), and grey hamster (*Cricetulus migratorius*). In this report, only the main results are given. For a more detailed elaboration, which includes also comprehensive list of material and biometrics, see Toškan (2002).

Viktorjev spodmol (known also as Podjamca) near the caves Škocjanske jame, south-western Slovenia (elevation 415 m a.s.l.) is part of a collapsed cave system of the river Reka. It is situated in the sub-Mediterranean region of Slovenia, on the very north-western border of the Balkan peninsula. The main source of the accumulation of small mammal remnants was evidently owl pellets. Samples thus reflect predator's preference towards prey (Andrews 1990).

Subfossil small mammal remnants were collected during the third, i.e. the final stage of excavations (phase IzA), when a mini stratigraphic excavations of plots 0.2 x 1 m with a depth of 5 cm as basic samples have been performed (*cf.* Turk, this volume). In total, 36 such samples (spits in subsequent text) were removed. The sediment was thieved (mesh sizes of 3 mm, 1 mm, and 0.5 mm, respectively) and small mammal remnants were extracted from a sediment fraction of particles 0.5–3.0 mm.

mentne frakcije velikosti od 0,5 do 3 mm. Nabrani vzorci so vsebovali zobe, spodnje in zgornje čeljustnice ter postkranialne skeletne elemente; slednjih v analizo nismo vključili. Ostanke malih sesalcev smo določali in merili pod stereomikroskopom pri različnih povečavah. Primerjalni recentni material izvira pretežno iz Slovenije in s sosednjih območij Balkana (zbirka Prirodoslovnega muzeja Slovenije, Ljubljana). Kvantitativne primerjave med taksoni temeljijo na številu določenih primerkov (*Number of Identified Specimens*, NISP) ter najmanjšem številu osebkov (*Minimum Number of Individuals*, MNI); za podrobnosti glej Grayson (1984) ter Klein in Cruz-Uribe (1993). V okviru biometrične analize smo obstoj statistično značilne heterogenosti med posameznimi vzorci ugotavljali s Schefféjevim in neparametričnim Kruskal-Wallisovim testom (StatSoft Inc. 1995). Režnje (izkope), ki so si bili podobni v vrstni sestavi malih sesalcev, smo združevali in pri tem upoštevali rezultate večdimenzionalnega skaliranja (*Multidimensional Scaling*; StatSoft Inc. 1995). Alohrone in alopatrične primerjave smo opravili z analizo grozdov (*Cluster Analysis*; StatSoft Inc., 1995), ki je temeljila na diagnonalno simetrični matriki podobnosti (evklidske razdalje). Statistična obdelava je bila narejena s programskim paketom StatSoft 1997, STATISTICA za Windows, verzija 5.1.

V besedilu označujemo kočnike kot: P - predmelja-

The material consisted of isolated teeth, maxillae, mandibles, and postcranial remnants. Postcranial material was not subjected to further analysis. Material was measured and determined under a dissecting microscope at various magnifications. Comparative recent material (mammal collection of the Natural History Museum of Slovenia) originates mainly from Slovenia and adjacent regions of the Balkan peninsula. Quantitative comparisons among taxa were based on a Number of Identified Specimens (NISP) and on a Minimum Number of Individuals (MNI); *cf.* Grayson (1984) and Klein & Cruz-Uribe (1993) for further details. Within the framework of biometric analysis we determined the existence of statistically characteristic heterogeneity among individual samples using the Scheffé test and the nonparametric Kruskal-Wallis test (StatSoft Inc. 1995). Pooling of spits on the basis of their similarity in small mammal assemblies was done by a Multidimensional Scaling (StatSoft Inc. 1995). Clustering of allochronic and allopatric samples was based on a matrix of Euclidean distances (Cluster Analysis; StatSoft Inc. 1995). Statistical calculations were run in StatSoft 1997, STATISTICA for Windows, version 5.1.

Cheek-teeth are abbreviated as follows: P - premolars, M - molars; capitals indicate upper teeth and small letters indicate the lower ones. The number denotes the

Razpredelnica 15.1: Najmanjše število determiniranih ostankov žužkojedov (Insectivora), netopirjev (Chiroptera) in glodalcev (Rodentia) iz najdišča Viktorjev spodmol.
Table 15.1: Minimum number of identified remnants of insectivores (Insectivora), bats (Chiroptera) and rodents (Rodentia) from the site Viktorjev spodmol. RPS - recently perturbated sediment.

Režanj Spit	Globina Depth (cm)	Volumen Volume (ml)	Plast Layer	Insectivora	Chiroptera	Rodentia	SKUPAJ TOTAL
1	254	235	nasutje RPS	5	0	46	51
2	259	180		11	0	101	112
3	264	275	1 & 2	15	0	127	142
4	269	300		17	0	127	144
5	274	345		15	0	164	179
6	279	415	2	30	0	127	157
7	284	535		23	0	159	182
8	289	450		11	0	127	138
9	294	375		13	0	128	141
10	299	475		18	0	125	143
11	304	430		10	0	149	159
12	309	555		14	2	162	178
13	314	770		14	1	203	218
14	319	685		9	0	156	165
15	324	635	3	15	1	237	253
16	329	570		12	0	279	291
17	334	685		15	2	342	359
18	339	535		9	0	319	328
19	353	325		8	1	194	203
$\sum$				264	7	3272	3543

ki, M - meljaki; velike tiskane črke označujejo gornje zobe, male pa spodnje. Položaj posameznega meljaka v zobnem nizu je označen s številko (anteriorno → posteriorno). Nomenklatura meljakov voluharic je povzeta po Van Der Meulenu (1973), miši in hrčkov pa po Niethammerju in Krappu (1978, 1982). Vse dimenzije so v milimetrih.

15.1 Rezultati

TAKSONOMIJA:

Red Insectivora Gray, 1827
Družina Soricidae Fischer, 1817

Sorex alpinus Schinz, 1837

Gorski rovki pripadata dva rostruma, ki sta vsebovala večino zob. Hipokon M1 ni bil pigmentiran, zaradi česar smo lahko izključili prisotnost gozdne rovke *Sorex araneus*.

Sorex araneus Linnaeus, 1758

Ostanke gozdne rovke (tri spodnje čeljustnice in trije

VIKTORJEV SPODMOL

position of a particular tooth in the tooth row (anterior → posterior). Nomenclature of molars is based on Van Der Meulen (1973; arvicolins) and Niethammer & Krapp (1978 for murins and 1982 for cricetins). All dimensions are in millimetres.

15.1 Results

TAXONOMY:

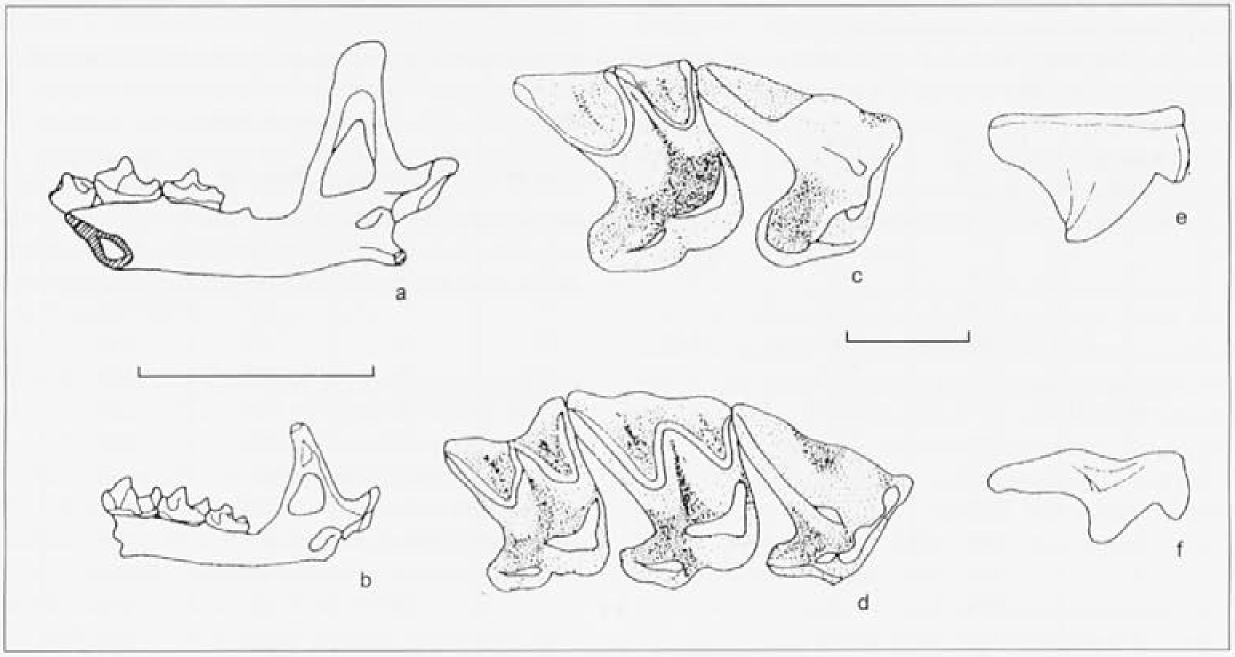
Order Insectivora Gray, 1827
Family Soricidae Fischer, 1817

Sorex alpinus Schinz, 1837

Two rostral fragments with the majority of teeth still in alveoli evidently belonged to the Alpine shrew. The common shrew *Sorex araneus* was excluded on the basis of M1 hypocone not being pigmented.

Sorex araneus Linnaeus, 1758

Remnants of the common shrew (three mandibles and three isolated cheek-teeth) were from spits 15 to 18 (Fig.



Sl. 15.1: Ostanki rovk iz Viktorjevega spodmola. Fragment desne spodnje čeljustnice (a) *Sorex araneus* (reženj 15) in (b) *Sorex minutus* (reženj 17). Grizalna površina kočnikov (c) *Crocidura leucodon* (P4-M1; reženj 15) in (d) *Crocidura suaveolens* (P4-M2; reženj 7). Labialna stran 4. zgornjega predmeljaka (P4; isti osebek kot na slikah c in d) pri (e) *Crocidura leucodon* in (f) *Crocidura suaveolens*. Črta ustreza dolžini 1 mm (c-f) oziroma 5 mm (a-b).

Fig. 15.1: Shrew remnants from Viktorjev spodmol. Fragments of right mandible in (a) *Sorex araneus* (spit 15) and (b) *Sorex minutus* (spit 17). Occlusal surface of cheek teeth in (c) *Crocidura leucodon* (P4-M1; spit 15) and (d) *Crocidura suaveolens* (P4-M2; spit 7). Labial side of 4th upper premolar (P4; same specimens as on Figs. c and d) in (e) *Crocidura leucodon* and (f) *Crocidura suaveolens*. Scale bar = 1 mm (c-f) or 5 mm (a-b).

izolirani kočniki) smo našli v režnjih 15 do 18 (sl. 15.1 a). Zaradi fragmentiranosti biometrična obdelava ni bila mogoča.

Sorex minutus Linnaeus, 1766

Ostanki male rovke obsegajo dva izolirana kočnika in deset spodnjih čeljustnic (sl. 15.1 b). Kavljasti podaljšek je v celoti ohranjen le pri eni izmed mandibul. Koronoidna višina (= 2,79) je bila sicer nekoliko manjša od recentnih *S. minutus* iz Slovenije (variacijska širina =3,0–3,6 mm; N=39; Kryštufek 1991), sklada pa se s fosilnim materialom iz interpleniglacialnih (OIS 3) plasti Divjih bab I (Kryštufek 1997).

Sorex alpinus/araneus

Trinajst ostankov rdečezobih rovk ni bilo mogoče določiti do vrste. Na podlagi dimenzij šestih fragmentov spodnjih čeljustnic in pa sedmih izoliranih kočnikov smo sicer lahko izključili prisotnost vrste *S. minutus*, ne pa tudi ločili med gorsko in gozdno rovko.

Crocidura leucodon (Hermann, 1780)

Poljski rovki pripada 11 izoliranih kočnikov, tri spodnje čeljustnice in dva rostruma. Po obliki obeh razpoložljivih P4 smo izključili možnost, da bi material pripadal *C. suaveolens* ali *C. russula* (sl. 15.1: c, e). Izmerjena dolžina niza spodnjih meljakov edine dobro ohranjene spodnje čeljustnice je omogočila primerjavo s fosilnim materialom iz jame Divje babe I (zahodna Slovenija), z recentnimi primerki *C. leucodon* iz Slovenije in z manjšo podvrsto *C. leucodon narentae* Bolkay, 1925 iz Bosne in Hercegovine, Črne gore ter zahodne Makedonije (Kryštufek 1997). Primerek iz Viktorjevega spodmola je sicer najbliže povprečni vrednosti za *C. leucodon narentae*, je pa še vedno v okviru variacijske širine recentne *C. leucodon* iz Slovenije (razpredelnica 15.2).

Crocidura suaveolens (Pallas, 1811)

Vrtna rovka je bila v vzorcu zastopana z osmimi izoliranimi kočniki, sedmimi spodnjimi čeljustnicami in rostrumom (sl. 15.1: d, f). Dolžina edinega popolnega niza spodnjih meljakov (reženj 16), je znašala 3,89 mm. S tem se ta rovka uvršča znotraj variacijske širine za recentno vrsto *C. suaveolens* s Sečoveljskih solin, JV Slovenija (razpon=3,42–3,91; povprečje=3,72; N=24).

15.1 a). Material was too fragmented to allow biometrical comparisons.

Sorex minutus Linnaeus, 1766

The pygmy shrew was represented by two isolated cheek-teeth and ten mandibles (Fig. 15.1 b). Coronoid process was preserved only in a single mandible. The coronoid height (= 2.79) was slightly lower than in recent *S. minutus* from Slovenia (range=3.0–3.6 mm; N=39), however, it matched the fossil material from the Interpleniglacial (OIS 3) layers of Divje babe I (Kryštufek 1997).

Sorex alpinus / araneus

Thirteen remnants of red-toothed shrews did not allow assignment to the species level. On the basis of measurements of six mandibular fragments and seven isolated cheek-teeth we excluded *S. minutus*, however, further separation between the common and the Alpine shrew was not possible.

Crocidura leucodon (Hermann, 1780)

Bi-coloured white-toothed shrew was represented by 11 isolate cheek-teeth, three mandibles, and two rostral parts. The P4 shape did not match the condition in either *C. suaveolens* or *C. russula* (Fig. 15.1: c, e) The length of

Razpredelnica 15.2: Opisna statistika za skupno dolžino spodnjih meljakov (m1–m3) v štirih vzorcih poljskih rovk *Crocidura leucodon*. Vzorci: 1 – recentna *C. leucodon*, Slovenija; 2 – recentna *C. leucodon narentae*, Bosna in Hercegovina, Črna gora in Makedonija; 3 – fosilni vzorec iz Divjih Bab I (plast 2–5; tj. pribl. 40.000 – 35.000 let p.s.), 4 – subfosilni primerek iz Viktorjevega spodmola (reženj 11). Podani so velikost vzorca (N), povprečje (M), standardna deviacija (SD) in variacijska širina (min. – max.). Vrednosti za vzorce 1–3 so povzete po Kryštufku (1997).

Table 15.2: Descriptive statistics for the length of mandibular molar row (m1–m3) in four samples of bi-coloured white-toothed shrew *Crocidura leucodon*. Samples: 1 – recent *C. leucodon* from Slovenia; 2 – recent *C. leucodon narentae* from Bosnia & Herzegovina and Macedonia; 3 – fossil sample from Divje babe I (layers 2–5; age ca. 40,000–35,000 yr. BP); 4 – subfossil specimen from Viktorjev spodmol (spit 11). Given are sample size (N), mean (M), standard deviation (SD) and range (min–max). Samples 1–3 are from Kryštufek (1997).

Vzorec Sample	N	M	SD	min–max
1	13	4,50	0,134	4,24–4,77
2	13	4,34	0,180	3,99–4,56
3	9	4,46	0,091	4,33–4,58
4	1	4,31	--	--

Družina *Talpidae* Fischer, 1817

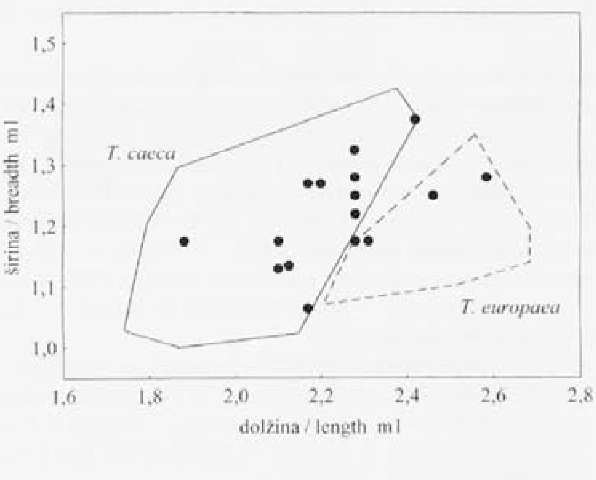
Talpa europaea/caeca

Subfosilni ostanki krtov iz Viktorjevega spodmola obsegajo le izolirane kočnike, zato zanesljivo razlikovanje med navadnim krtom *Talpa europaea* Linnaeus, 1758 in sredozemskim krtom *T. caeca* Savi, 1822, ni bilo mogoče. Čeprav se razlikujeta v velikosti (*T. europaea* je večji), se vrednosti dolžine in širine meljakov med obema vrstama praviloma na veliko prekrivajo. Še najboljše razlikovanje so omogočale dimenzije m1 in m2 (Toškan 2002). Na osnovi velikosti m1 smo v vzorcu potrdili prisotnost ostankov obeh vrst (sl. 15.2).

Navadni krt danes naseljuje pretežni del Evrope, tudi Slovenijo, kjer je splošno razširjen (Kryštufek 1991). Po drugi strani ima sredozemski krt tipično mediteransko razširjenost z nekaterimi reliktnimi populacijami bolj na severu. V Sloveniji ne živi, pa tudi za mlajši pleistocen Slovenije Rakovec (1973) navaja le *T. europaea*. Ostanki *T. caeca* so sicer znani iz würma SV Italije (npr. Brecce di Soave pri Veroni; Bon *et al.* 1991) in nekdanje Jugoslavije (Malez 1986), vendar so tudi tam razmeroma redki.

Red Chiroptera Blumenbach, 1779

Ostanki netopirjev so bili izjemno redki (skupno pet



Sl. 15.2: Odnos med širino in dolžino prvega spodnjega meljaka pri krtih. Poligona obkrožata vrednosti za 29 recentnih *T. europaea* iz zahodne Slovenije (prekinjena črta) in 30 recentnih *T. caeca* iz Bosne in Hercegovine, Črne gore ter Kosova (sklenjena črta). Pike predstavljajo subfosilne primerke iz Viktorjevega spodmola.

Fig. 15.2: Scatter plot of breadth of the first lower molar against its length in moles. Polygons enclose scores for 29 recent *T. europaea* from western Slovenia (broken line) and 30 recent *T. caeca* from Bosnia and Herzegovina, Montenegro and Kosovo (straight line). Dots indicate subfossil specimens from Viktorjev spodmol.

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the lower molar row of the only well preserved mandible allowed comparison with the fossil material from the site Divje babe I (western Slovenia), as well as with the recent *C. leucodon* from Slovenia and the smaller subspecies *C. leucodon narentae* Bolkay, 1925 from Bosnia & Herzegovina, Montenegro, and western Macedonia (Kryštufek 1997). The specimen from Viktorjev spodmol approached the mean for *C. leucodon narentae*, however, it still felt within the range for the recent *C. leucodon* from Slovenia (Table 15.2).

Crocidura suaveolens (Pallas, 1811)

The lesser white-toothed shrew was represented by eight isolated cheek-teeth, seven mandibles and a rostrum (Fig. 15.1: d, f). Length of the only complete mandibular molar row (spit 16) measured 3.89 mm and as such matched the range for the recent *C. suaveolens* from Sečoveljske soline, south-western Slovenia (range=3.42-3.91; mean=3.72; N=24).

Family *Talpidae* Fischer, 1817

Talpa europaea / caeca

Subfossil mole material from Viktorjev spodmol contained only isolated cheek-teeth, which did not allow reliable separation between the common mole *Talpa europaea* Linnaeus, 1758 and the blind mole *T. caeca* Savi, 1822. In spite of the size differences (with *T. europaea* being bigger), ranges of the two overlap considerably. Best separation was achieved on the basis of m1 and m2 dimensions (Toškan 2002). Size of m1 suggested that both species are represented in our material (Fig. 15.2).
The common mole populates the majority of Europe, including Slovenia. On the other hand, the range of the blind mole is restricted to the Mediterranean regions with few relict isolates further north. It does not occur in Slovenia, however. Besides, Rakovec (1973) cites only *T. europaea* for the Upper Pleistocene in Slovenia. Remnants of *T. caeca* are reported, albeit comparatively rarely, for the Würmian of the north-eastern Italy (*e.g.* Brecce di Soave near Verona; Bon *et al.* 1991) as well as from the territory of the former Yugoslavia (Malez 1986).

Order Chiroptera Blumenbach, 1779

Bat remnants were extremely rare (altogether five cheekteeth and fragments of the lower and upper jaws). Isolated teeth and fragmented material made determination difficult or even impossible (as was the case with two isolated teeth).

meljakov ter fragmenti spodnje in zgornje čeljustnice). Zaradi narave vzorca (izolirani zobje, velika fragmentiranost) je bila natančna določitev težavna, v dveh primerih pa celo nemogoča.

Družina Vespertilionidae Gray, 1821

Myotis blythii (Tomes, 1857)

Ostrouhemu netopirju smo pripisali izoliran M1 iz režnja 17. Živi v toplih območjih, ki niso gosto porasla z drevjem in grmičevjem. V Sloveniji je v glavnem vezan na submediteransko območje, zabeležen pa je bil tudi na južnih pobočjih Julijskih Alp (Kryštufek in Červeny 1997).

Myotis emarginatus (Geoffroy, 1806)

Ostanki vejicatega netopirja obsegajo fragment spodnje čeljustnice in izoliran meljak. Gre za netopirja, ki ima raje gozdne habitate (Kurtén 1968), zadržuje se na toplih mestih, prezimuje pa v jamah (Kryštufek 1991).

Pipistrellus ex. gr. *pipistrellus* (Schreber 1774)

Fragment zgornje čeljustnice iz režnja 15 pripada eni od dveh vrst dvojčic *Pipistrellus pipistrellus* (Schreber, 1774) ali *P. pygmaeus* (Leach, 1825). Obe živita v Sloveniji (Presetnik *et al.* 2001), material pa ne omogoča nadaljnje uvrstitve.

Eptesicus serotinus (Schreber, 1774)

Pozni (širokokrili) netopir je bil v vzorcu zastopan z M1 iz režnja 17. V osnovi gre za drevesno vrsto (rad ima odprto gozdnato krajino), pojavlja pa se tudi v stavbah in jamah (Kryštufek 1991). V Sloveniji je znan z več nahajališč.

Red Rodentia Griffith, 1827
Družina Sciuridae Gray, 1821

Sciurus vulgaris Linnaeus, 1758

Veverici smo pripisali po en p4 in M3. Slednji se po dimenzijah (dolžina x širina=4,00 x 4,31) sklada z vrednostmi za recentno vrsto *S. vulgaris* iz Slovenije (variacijska širina=3,69–4,13 x 3,99–4,48; N=17).

Family Vespertilionidae Gray, 1821

Myotis blythii (Tomes, 1857)

The lesser mouse-eared bat was represented by an isolated M1 from spit 17. This species prefers warm regions, which are not densely overgrown with trees and shrubs. Majority of recent localities in Slovenia are from the sub-Mediterranean region, albeit it was collected also on the southern slopes of the Alps (Kryštufek & Červeny 1997).

Myotis emarginatus (Geoffroy, 1806)

A lower jaw fragment and an isolated molar were ascribed to Geoffroy's bat. Species prefers wooded habitats (Kurtén 1968), where it seeks warm sites; hibernaculas are in caves (Kryštufek 1991).

Pipistrellus ex. gr. *pipistrellus* (Schreber 1774)

Maxillary fragment from spit 15 belonged to one of the two sibling species: *Pipistrellus pipistrellus* (Schreber 1774) or *P. pygmaeus* (Leach, 1825). Both species occur in Slovenia (Presetnik *et al.* 2001), the available material from Viktorjev spodmol, however, did not allow further allocation.

Eptesicus serotinus (Schreber 1774)

Serotine was represented in our material by a single M1 from spit 17. This bat is mainly a tree species, preferring open woodland; finds are fairly common also in buildings and caves (Kryštufek 1991). Recent records place it at numerous sites all over Slovenia.

Order Rodentia Griffith, 1827
Family Sciuridae Gray, 1821

Sciurus vulgaris Linnaeus, 1758

Red squirrel was represented by two isolated cheek-teeth: p4 and M3. In its measurements (length x width=3.93 x 4.48) the latter fits the range for the recent *S. vulgaris* from Slovenia (range=3.69–4.13 x 3.97–4.48; N=17).

Family Muridae Illiger, 1815
Subfamily Cricetinae Fischer, 1817

Cricetulus migratorius (Pallas, 1773)

Three isolated molars (M1, M2, and m1; Fig. 15.3: a, b)

Družina Muridae Illiger, 1815
Poddružina Cricetinae Fischer, 1817

Cricetulus migratorius (Pallas, 1773)

Sivi hrček je bil zastopan s tremi izoliranimi meljaki (M1, M2 in m1; sl. 15.3: a, b) iz režnjev 11 in 18. Dimenzije (dolžina x širina) omenjenih zob so naslednje: m1=1,86 x 1,14, M1=1,94 x 1,25 in M2=1,40 x 1,25. Navedene vrednosti se sicer ujemajo s tistimi za nekoliko večjo fosilno vrsto *Allocricetus bursae* Schaub, 1930, ki jih navajajo za material iz Bolgarije in Madžarske ter tako presegajo tiste za vrsto *C. migratorius* iz Moldavije (recentno) in različnih mlajšepleistocenskih najdišč JV Evrope in Bližnjega vzhoda (glej Toškan in Kryštufek, v tisku). Vendar pa Mayhew (1978) in Hír (1993) opozarjata, da dimenzije izoliranih meljakov niso primeren kriterij za zanesljivo razlikovanje med obema navedenima vrstama. K temu prispeva tudi dejstvo, da so bili fosilni meljaki vrste *C. migratorius* večji od recentnih in da njihove dimenzije odsevajo tudi geografsko širino, nadmorsko višino, (mikro)klimo ter vrsto habitata (Popov 1994; Vohralík 1999).

Sicer pa je razlikovanje med obema vrstama problematično tudi ob upoštevanju morfoloških lastnosti meljakov. Bartolomei (1964), Mayhew (1978) in Popov (1989) celo menijo, da razlike med vrstama v morfologiji meljakov nimajo taksonomske vrednosti. Po drugi strani Tchernov (1968) in Niethammer (1982) navajata, da je posteriorni cingulum M1 pri *C. migratorius* dobro razvit, pri *A. burse* pa navadno odsoten ali kvečjemu nakazan. Na osnovi te značilnosti M1 iz Viktorjevega spodmola lahko pripišemo vrsti *C. migratorius* (sl. 15.3 a). Nenazadnje so najmlajši znani ostanki vrste *A. bursae* iz srednje Evrope datirani v začetek würma (Madžarska; Jánossy 1986), medtem ko je bil *C. migratorius* prisoten skozi celoten mlajši pleistocen (glej Toškan in Kryštufek, v tisku), njegovi ostanki pa so bili najdeni tudi v bližnjih Pečinah pod Muzarji pri Gabrovcu – *Grotta dell'Orso*; pozni würm/zgodnji holocen; Bon *et al.* 1991) in v Ciganski jami pri Briščikih (*Grotta degli Zingari*; preboreal; Bartolomei 2001).

Poddružina Arvicolinae Gray, 1821

Chionomys nivalis (Martins, 1842)

Snežna voluharica je bila zastopana v 17-ih režnjih (= 89,5 %). Po dolžini prvega spodnjega meljaka se primerki iz Viktorjevega spodmola ujemajo z recentnimi *Ch. nivalis* iz Julijskih Alp, ne dosegajo pa vrednosti recentnih primerkov s Snežnika (razpredelnica 15.3). Od petih morfotipov m1, ki jih navaja Nadachowski (1984a), sta bila v Viktorjevem spodmolu zastopana dva: *nivalid/ratticepid* (N=3) in *nivalid* (N=13). Navedena morfotipa

from spits 11 and 18 evidently represented the grey hamster. Molar dimensions (length x width) were as follows: m1=1.86 x 1.14, M1=1.94 x 1.25, and M2=1.40 x 1.25. These values fit the range of the slightly larger fossil *Allocricetus bursae* Schaub, 1930, reported from Bulgaria and Hungary and are, as such, above the maximum for *C. migratorius* from Moldova (recent) as well as from various Upper Pleistocene sites of south-eastern Europe and the Near East (*cf.* Toškan & Kryštufek, in press). However, Mayhew (1978) and Hír (1993) warn that dimensions of isolated molars are not necessarily a suitable criterion for distinguishing between the two species. Besides, *C. migratorius* tends to be larger in fossil samples than in recent populations. Even in recent hamsters the molar size reflects their geographic origin, elevation, (micro)climate, and habitat (Popov 1994; Vohralík 1999).

Molar morphology provides hardly any clues which would allow reliable allocation of specimens into the proper species. Even more so, Bartolomei (1964), Mayhew (1978) and Popov (1989) entirely discard the molar morphology as a taxonomic character. Tchernov (1968) and Niethammer (1982), on the other hand, state the posterior cingulum to be well developed in *C. migratorius* but absent or weak at best in *A. bursae*. By this character, the M1 from Viktorjev spodmol represents *C. migratorius* (Fig. 15.3 a). The very last Central European records of *A. bursae* date to the Early Würmian of Hungary (Jánossy 1986), while *C. migratorius* is present throughout the entire Pleistocene (*cf.* Toškan in Kryštufek, in press). From the immediate vicinity of Viktorjev spodmol, fossil / subfossil *C. migratorius* is known from the cave Pečina pod Muzarji pri Gabrovcu (*Grotta dell'Orso*; Late Würm / Early Holocene; Bon *et. al.* 1991) and from the cave Ciganska jama pri Briščikih (*Grotta degli Zingari*; Preboreal; Bartolomei 2001).

Subfamily Arvicolinae Gray, 1821

Chionomys nivalis (Martins, 1842)

Snow vole was represented in 17 spits (= 89.5 %). In m1 length of the material from Viktorjev spodmol fit well the recent sample from the Julian Alps but did not reach the large size of a nearby population from the mountain Snežnik (Table 15.3). Of the five m1 morphotypes listed by Nadachowski (1984a), only two were recorded in Viktorjev spodmol: *nivalid* (N=13) and *nivalid / ratticepid* (N=3). Both morphotypes (Fig. 15.3: c, d) also dominate in recent *Ch. nivalis* samples from the Julian Alps and from Snežnik, respectively (Kryštufek 1990), as well as in the Upper Pleistocene material from Divje babe I (Toškan 2002).

(sl. 15.3: c, d) sta najpogostejša tudi v vzorcu recentnih *Ch. nivalis* iz Julijskih Alp in s Snežnika (Kryštufek 1990) ter fosilnih primerkov iz mlajšepleistocenskih plasti Divjih bab I (Toškan 2002).

Arvicola terrestris (Linnaeus, 1758)

Veliki voluhar je v materialu iz Viktorjevega spodmola zastopan s 53 meljaki. Razlike v dolžini M3 med subfosilnimi primerki iz Viktorjevega spodmola in recentnim materialom iz Slovenije niso statistično značilne (pri $p < 0,05$), so pa subfosilni (predvsem pa recentni) M3 krajši od mlajšepleistocenskih primerkov iz najdišča Divje babe I (razpredelnica 15.4). O podobnem trendu zmanjševanja dolžine tretjega zgornjega meljaka v času würma in holocena poroča tudi Nadachowski (1984a) za velikega voluharja iz bolgarske jame Bacho Kiro (N=41).

Analiza morfotipov je pokazala, da lahko šest M3 od sedmih iz Viktorjevega spodmola pripišemo kompleksnejšemu morfotipu *exitus* (*sensu* Nadachowski 1984a), le enega pa preprostejšemu morfotipu *terrestris*, ki ga Nadachowski (1984a) povezuje z milejšo klimo (sl. 15.3: e, f). Razmerje med morfotipoma je podobno ugotovljenemu pri recentnih *A. terrestris* z Žirovskega vrha (N=14), medtem ko je v vzorcu würmskih primerkov iz Divjih bab I (N=9) ter recentnih s Čavna (N=16) prevladoval morfotip *terrestris* (Toškan 2002).

Clethrionomys glareolus (Schreber, 1780)

Ostanke gozdne (rdeče) voluharice smo našli v vseh 19-ih režnjih. S skupno 649-imi zobmi je v materialu iz Viktorjevega spodmola daleč najpogostejša voluharica (razpredelnica 15.10). K temu je sicer do neke mere prispevalo tudi dejstvo, da je *C. glareolus* eden redkih pred-

Razpredelnica 15.3: Opisna statistika za dolžino m1 v treh vzorcih snežne voluharice *Chionomys nivalis*. Homogeni seti temeljijo na Scheffejevem testu. Vzorci: 1 - recenten iz Julijskih Alp; 2 - subfosilni vzorec iz Viktorjevega spodmola, 3 - recenten s Snežnika. KV - koeficient variacije; za druge okrajšave glej tabelo 2.
Table 15.3: Descriptive statistics for m1 length in three samples of the snow vole *Chionomys nivalis*. Homogeneous sets are based on Scheffé test. Samples: 1 - recent from the Julian Alps; 2 - subfossil from the site Viktorjev spodmol; 3 - recent from Mt. Snežnik. KV - Coefficient of variation; for other abbreviations see Table 15.2.

Vzorec Sample	N	M	min–max	SD	Homogeni seti Homogeneous sets	
1	35	2,84	2,53–3,19	0,157	X	
2	16	2,76	2,58–2,96	0,130	X	
3	16	3,07	2,74–3,44	0,202		X

Arvicola terrestris (Linnaeus, 1758)

Fifty-three molars of the water vole were found in the material from Viktorjev spodmol. No significant difference (at $p < 0.05$) was detected in M3 length between subfossil specimens from Viktorjev spodmol and the recent water voles from Slovenia. However, M3 was significantly longer in the Upper Pleistocene material from Divje babe I than in Viktorjev spodmol as well as in the recent sample from Slovenia (Table 15.4). Nadachowski (1984a) reports a similar trend in size decrease during the Würm and the Holocene in the material from Bacho Kiro (N=41).

Six out of seven M3 specimens were ascribed to a more complex morphotype *exitus* (sensu Nadachowski 1984a), while a single one fit the diagnosis for a simpler morphotype *terrestris* (Fig. 15.3: e, f). In Nadachowski's opinion (1984a) the former morphotype reflects mild climate. Similar ratio of the two morphotypes was found in recent *A. terrestris* from the mountain Žirovski vrh (N=14). On the other hand, recent sample from the mountain Čaven (N=16) and the Upper Pleistocene material from Divje babe I (N=9) showed a higher share of *terrestris* morphotype (Toškan 2002).

Clethrionomys glareolus (Schreber, 1780)

Bank vole was present in all 19 spits and was, with 694 molars, by far the most common vole in Viktorjev spodmol (Table 15.10). Such a commonness partly reflects the fact that each bank vole's molar could be ascribed

Razpredelnica 15.4: Opisna statistika za dolžino M3 v treh vzorcih velikega voluharja *Arvicola terrestris*. Homogeni seti temeljijo na Scheffejevem testu. Kruskal-Wallisov test (H=13,22) kaže na statistično značilno heterogenost med vzorci (pri $p < 0,01$). Vzorci: 1 - recentna *A. terrestris*, Slovenija (Žirovski vrh (N=14) in Čaven (N=16)); 2 - subfosilni vzorec iz Viktorjevega spodmola, 3 - fosilni vzorec iz Divjih bab I (zgodnji glacial - interpleniglacial). KV - koeficient variacije; za druge okrajšave glej tabelo 2.
Table 15.4: Descriptive statistics for M3 length in three samples of the water vole *Arvicola terrestris*. Homogeneous sets are based on Scheffé test. Kruskal-Wallis test (H=13.22) denotes significant heterogeneity among samples (at $p < 0.01$). Samples: 1 - recent from Slovenia: pooled samples from Mt. Žirovski vrh (N=14) and Mt. Čaven (N=16); 2 - subfossil from the site Viktorjev spodmol; 3 - fossil from Divje babe I (Early Glacial-Interpleniglacial). KV - Coefficient of variation; for other abbreviations see Table 15.2.

Vzorec Sample	N	M	min–max	SD	Homogeni seti Homogeneous sets	
1	30	2,34	1,98–2,58	0,134	X	
2	6	2,43	2,24–2,55	0,126	X	X
3	10	2,55	2,20–2,70	0,151		X

stavnikov svoje poddružine brez stalno rastočih meljakov. Prisotnost korenin in značilna oblika skleninskih grebenov sta namreč omogočala zanesljivo določitev vseh meljakov, ne le m1 kot pri večini drugih voluharic v vzorcu.

V dolžini m1 primerki iz Viktorjevega spodmola presegajo recentne iz Slovenije, medtem ko njihova primerjava s fosilnimi m1 iz Divjih bab I ni pokazala statistično značilnih razlik (razpredelnica 15.5). Janžekovič (1996) sicer ugotavlja, da recentne gozdne voluharice iz Slovenije in s sosednjih območij kažejo pozitiven Bergmannov odziv, vendar v primeru našega materiala najbrž ne moremo sklepati na korelacijo med velikostjo (dolžino m1) in klimo v tedanjem nahajališču. Trend zmanjševanja dolžine m1 je sicer pri fosilnih *C. glareolus* iz Bolgarije opazil tudi Nadachowski (1984a).

Analiza morfotipov M3 v materialu iz Viktorjevega spodmola je pokazala na prevlado tipa *complex*

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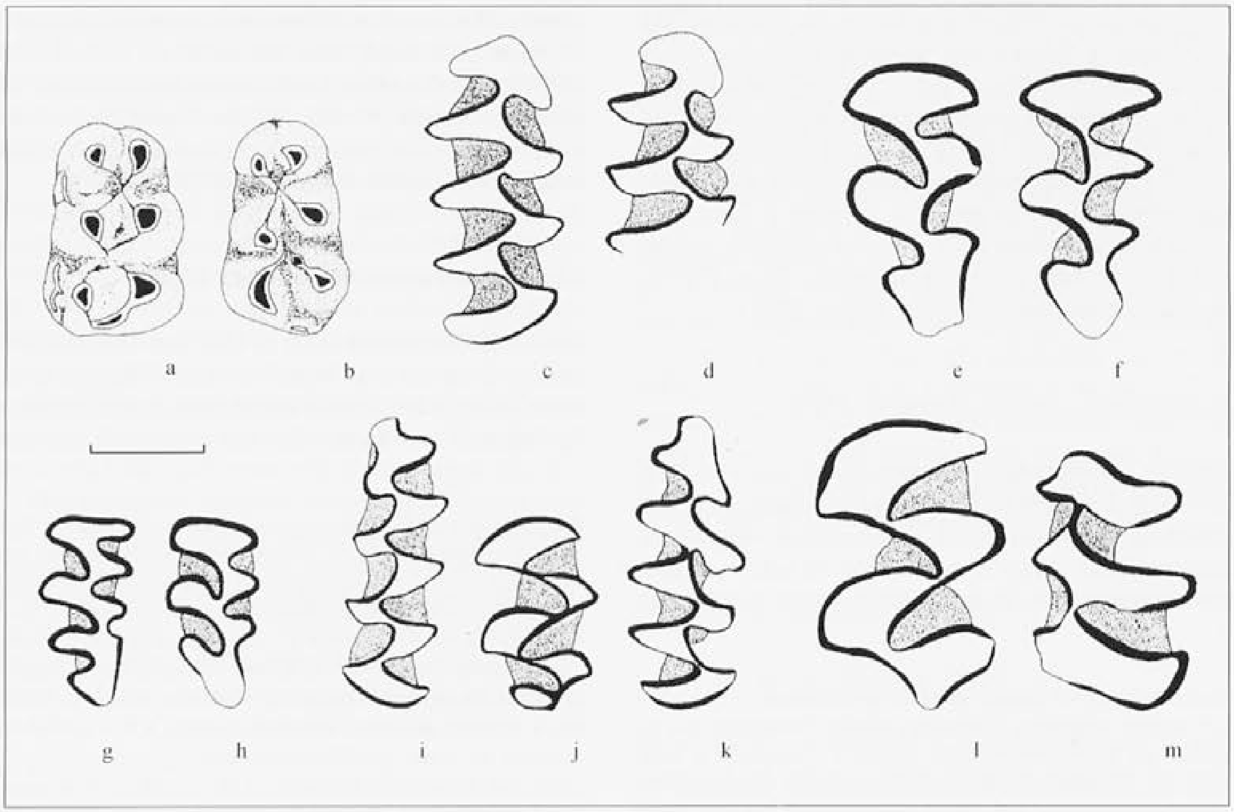
to this species due to the characteristic shape of the enamel pattern and also by its rooted condition. In *Microtus* voles, only m1 allowed taxonomic allocations into a species or a species group.

The m1 from Viktorjev spodmol did not differ significantly in length from the Upper Pleistocene specimens from Divje babe I but was longer than in recent bank voles from Slovenia (Table 15.5). Janžekovič (1996) found positive Bergmann's respond in cranial size in recent bank voles from Slovenia and adjacent regions. It does not seem likely, however, that the large size of Viktorjev spodmol material was related to the climate of the site. Temporal decrease in m1 length is documented also in fossil bank voles from Bulgaria (Nadachowski 1984a).

The prevailing M3 morphotype in Viktorjev spodmol was the *complex* one (mainly its *typica* variant; Fig.



Sl. 15.3: Meljaki hrčkov (Cricetinae) in voluharic (Arvicolinae) iz Viktorjevega spodmola. *Cricetulus migratorius*: (a) 1. zgornji meljak (reženj 11); (b) 1. spodnji meljak (reženj 18). *Chionomys nivalis*, 1. spodnji meljak: (c) morfotip "nivalid" (reženj 3); (d) morfotip "nivalid - ratticepid" (reženj 7). *Arvicola terrestris*, 3. zgornji meljak: (e) morfotip "terrestris" (reženj 5); (f) morfotip "exitus" (reženj 7). *Clethrionomys glareolus*, 3. zgornji meljak: (g) morfotip "complex - typica" (reženj 3); (h) morfotip "simplex" (reženj 11). (i) 1. spodnji meljak *Microtus arvalis/agrestis* (reženj 2). (j) 2. zgornji meljak *Microtus agrestis* (reženj 11). (k) 1. spodnji meljak *Microtus subterraneus/liechtensteini* (reženj 3). *Dinaromys bogdanovi*: (l) 2. zgornji meljak (reženj 18); (m) 3. spodnji meljak (reženj 15). Črta ustreza dolžini 1 mm.

Fig. 15.3: Molars of hamsters (Cricetinae) and voles (Arvicolinae) from Viktorjeve spodmol. *Cricetulus migratorius*: (a) 1st upper molar (spit 11); (b) 1st lower molar (spit 18). *Chionomys nivalis*, 1st lower molar: (c) "nivalid" morphotype (spit 3); (d) "nivalid-ratticepid" morphotype (spit 7). *Arvicola terrestris*, 3rd upper molar: (e) "terrestris" morphotype (spit 5); (f) "exitus" morphotype (spit 7). *Clethrionomys glareolus*, 3rd upper molar: (g) "complex-typica" morphotype (spit 3); (h) "simplex" morphotype (spit 11). (i) 1st lower molar of *Microtus arvalis/agrestis* (spit 2). (j) 2nd upper molar of *Microtus agrestis* (spit 11). (k) 1st lowe molar of *Microtus subterraneus/liechtensteini* (spit 3). *Dinaromys bogdanovi*: (l) 2nd upper molar (spit 18); (m) 3rd lower molar (spit 15). Scale bar=1 mm.

(predvsem podtipa *typica*; sl. 15.3: g, h), kar je sicer značilno tudi za recentne gozdne voluharice iz Slovenije in pa fosilne iz Divjih bab I (razpredelnica 15.6).

Microtus agrestis/arvalis

Arvikolidne prve spodnje meljake z ločenima dentinskima poljema T4 in T5 smo našli v vseh 19-ih režnjih (sl. 15.3 i). Na osnovi oblike anterokonidnega kompleksa jih lahko vse pripišemo poljski voluharici *Microtus arvalis* (Pallas, 1779) ali travniški voluharici *M. agrestis* (Linnaeus, 1761). Zanesljivo razlikovanje med obema vrstama omogoča le M2, ki ima pri travniški voluharici dodaten posterolingvalni trikotnik (T5; sl. 15.3 j), čeprav je tudi ta znak podvržen časovni in geografski variabilnosti (Kowalski 1970; Nadachowski 1985; Kryštufek 1986). Razmeroma veliko število M2 z dodatnim posterolingvalnim trikotnikom T5 v vzorcu iz Viktorjevega spodmola (N=30) vseeno kaže na prisotnost travniške voluharice.

Prve spodnje meljake smo določali po znakih, ki jih predlaga Nadachowski (1984b). Ker sta pri *M. arvalis* trikotnika T4 in T5 približno enako velika, pri *M. agrestis* pa je T5 večji od T4, omogoča količnik med dolžinama trikotnikov (T4/T5) glede na dolžino m1 dokaj učinkovito razlikovanje obeh vrst. Na osnovi tega znaka ugotavljamo, da sta v materialu iz Viktorjevega spodmola prisotni obe vrsti, od katerih je *M. arvalis* pogostejša (sl. 15.4). Danes na območju obravnavanega najdišča ne živi nobena od teh dveh voluharic (Kryštufek 1991).

Microtus liechtensteini/subterraneus

Pri determinaciji subfosilnih pitymoidnih prvih spodnjih meljakov (sl. 15.3 k) smo upoštevali dve recentni vrsti: vrtno voluharico *Microtus subterraneus* (de Salys-Longchamps, 1836) in ilirsko voluharico *M. liechtensteini* (Wettstein, 1927; za taksonomijo in nomenklaturo glej Spitzenberger 2001). Njune meljake smo našli v 17-ih režnjih.

Microtus subterraneus in *M. liechtensteini* se razlikujeta po kromosomskem številu, morfološko pa sta si zelo

15.3: g, h). The same condition is characteristic of recent bank voles from Slovenia as well as of the Upper Pleistocene material from Divje babe I (Table 15.6).

Microtus agrestis / arvalis

Arvicoline m1 with separate dentine fields of triangles T4 and T5 were found in all 19 spits (Fig. 15.3 i). On the basis of the shape of the anteroconid complex they were all ascribed to either common vole *Microtus arvalis* (Pallas, 1779) or to field vole *M. agrestis* (Linnaeus, 1761). Reliable distinction between the two species is possible on the basis of M2, which has an additional

Razpredelnica 15.5: Opisna statistika za dolžino m1 v petih vzorcih gozdne voluharice *Clethrionomys glareolus*. Homogeni seti temeljijo na Schefféjevem testu. Kruskal-Wallisov test (H=24,32) kaže na statistično značilno heterogenost med vzorci (p < 0,001). Vzorci: 1 - recentni iz Slovenije; 2 - subfosilni vzorec iz Viktorjevega spodmola; 3 - fosilni vzorec iz Divjih bab I (interpleniglacial; OIS 3); 4 - fosilni vzorec iz Divjih bab I (zgodnji glacial/interpleniglacial), 5 - fosilni vzorec iz Divjih bab I (zgodnji glacial; OIS 5). Podani so velikost vzorca (N), povprečje (M), variacijska širina (min. - max.), standardna deviacija (SD) in koeficient variacije (KV).
Table 15.5: Descriptive statistics for m1 length in five samples of the bank vole *Clethrionomys glareolus*. Homogeneous sets are based on Scheffé test. Kruskal-Wallis test (H=24.32) denotes significant heterogeneity among samples (at p < 0.001). Samples: 1 - recent from Slovenia; 2 - subfossil from the site Viktorjev spodmol; 3 - fossil from Divje babe I (Interpleniglacial; OIS 3); 4 - fossil from Divje babe I (Early Glacial / Interpleniglacial); 5 - fossil from Divje babe I (Early Glacial; OIS 5). See Tables 15.2 and 15.4 for further explanation.

Vzorec Sample	N	M	min–max	SD	Homogeni seti Homogeneous sets	
1	104	2,29	1,79–2,60	0,196	X	
2	112	2,37	1,98–2,93	0,147		X
3	117	2,40	2,11–2,76	0,153		X
4	92	2,41	2,05–2,96	0,182		X
5	38	2,40	2,13–2,81	0,176		X

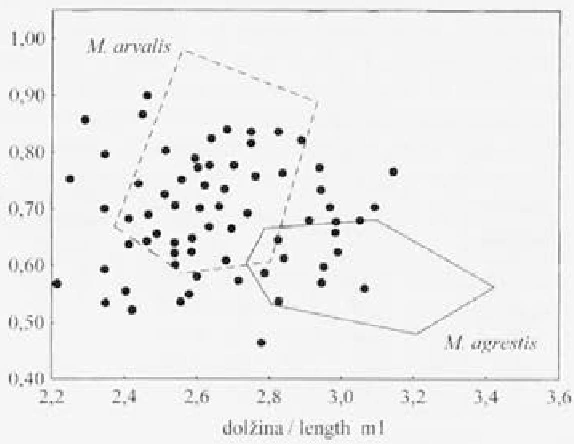
Razpredelnica 15.6: Frekvence zastopanosti (%) posameznih morfotipov M3 pri treh vzorcih gozdne voluharice *Clethrionomys glareolus*. Vzorci: 1 - fosilne iz Divjih bab I (würm); 2 - subfosilne iz Viktorjevega spodmola; 3 - recentne iz zahodne Slovenije. Podane so tudi velikosti posameznih vzorcev (N). Za definicijo morfotipov glej besedilo in sliko 3.
Table 15.6: Frequency of occurrence (%) of various M3 morphotypes in the bank vole *Clethrionomys glareolus*. Samples: 1 - fossil from Divje babe I (Würm); 2 - subfossil from the site Viktorjev spodmol; 3 - recent from western Slovenia. Given are sample sizes (N). See text and Fig. 15.3 for definition of morphotypes.

Vzorec Sample	N	TIP A (TYPE A) *Simplex*		TIP B1 (Type B1) *Complex*		TIP B2 (Type B2) *Complex–typica*		TIP B3 (Type B3) *Complex–duplicata*	
		N	%	N	%	N	%	N	%
1	65	11	16,9	1	1,5	35	53,8	18	27,8
2	103	26	25,2	10	9,7	55	53,4	12	11,7
3	30	5	16,7	7	23,3	10	33,3	8	26,7

podobni. Na osnovi izoliranih zob zanesljivo ločevanje med njima ni mogoče. Po velikosti se vrsti sicer razlikujeta (*M. liechtensteini* je večji), vendar se vrednosti dolžine prvega spodnjega meljaka na veliko prekrivajo (Kryštufek 1997). Subfosilni primerki iz Viktorjevega spodmola so manjši od recentnega materiala obeh vrst iz Slovenije (razpredelnica 15.7). Na osnovi dolžine m1 lahko torej sklepamo, da so v analiziranem subfosilnem materialu ostanki *M. subterraneus*. Navedena domneva pa, kolikor je pravilna, preseneča. Danes je namreč na območju Viktorjevega spodmola prisoten le *M. liechtensteini*, medtem ko je arealni rob *M. subterraneus* pomaknjen približno 50 km SV v osrednjo Slovenijo (Kryštufek 1991).

Dinaromys bogdanovi (Martino et Martino, 1922)

Dinarski voluharici smo pripisali dva M2 in en m3 (sl. 15.3: l, m). Dolžina M2 subfosilnih primerkov (= 2,32 in 2,36) je v okviru variacijske širine za recentne populacije *D. bogdanovi* iz Bosne in Hercegovine, Hrvaške in s Kosova (variacijska širina: 2,09–2,43; povprečje: 2,27; N=30). Dinarska voluharica je reliktna vrsta, ki danes naseljuje dinarsko in šarsko-pindsko gorstvo nekdanje Jugoslavije, od Velebita na severu do Galičice na jugu. Trije meljaki iz Viktorjevega spodmola predstavljajo prvo holocensko najdbo omenjene vrste zunaj njenega današnjega areala razširjenosti (Toškan in Kryštufek, v tisku).



Sl. 15.4: Odnos med količnikom trikotnikov T4 in T5 kot imenovalcem (T4/T5) in dolžino prvega spodnjega meljaka pri *Microtus agrestis/arvalis*. Poligona obkrožata vrednosti za 45 recentnih *M. agrestis* (sklenjena črta) in 45 recentnih *M. arvalis* (prekinjena črta) iz osrednje Slovenije (povzeto po Kryštufek, 1997). Pike označujejo subfosilne primerke *M. agrestis/arvalis* iz Viktorjevega spodmola.
Fig. 15.4: Scatter diagram plot of the quotient of triangles T4 with T5 as denominator (T4/T5) against the length of the first lower molar in *Microtus agrestis/arvalis*. Polygons enclose scores for 45 recent *M. agrestis* (straigth line) and 45 recent *M. arvalis* (broken line), both from central Slovenia (after Kryštufek 1997). Dots indicate subfossil *Microtus agrestis/arvalis* from Viktorjev spodmol.

postero-lingual triangle (T5; Fig. 15.3 j). However, even this character is subject to temporal and geographic variation (*cf.* Kowalski 1970; Nadachowski 1985; Kryštufek 1986). Despite all this, a fairly large number of M2 with the additional postero-lingual triangle T5 (N=30) does prove the presence of *M. agrestis* at the site Viktorjev spodmol.

Species identity of m1 was assessed by the method proposed by Nadachowski (1984b). Triangles T4 and T5 are approximately of the same size in *M. arvalis*, while in *M. agrestis* T5 tends to be larger than T4. The quotient of the lengths of the two dental fields (T4 / T5), plotted against m1 length, allows fairly good separation between the two species. On the basis of this approach, one can conclude that both species are present in the material from Viktorjev spodmol with *M. arvalis* being more common (Fig. 15.4). Neither of these voles lives in this region today.

Microtus liechtensteini / subterraneus

For the pitymoid m1 material from Viktorjev spodmol (Fig. 15.3 k) we considered the possibility of representing one of the two recent species in Slovenia: *Microtus subterraneus* (de Salys-Longchamps, 1836) or *M. liechtensteini* (Wettstein, 1927; *cf.* Spitzenberger 2001, for discussion on taxonomy and nomenclature). Pitymoid molars were found in 17 spits.

Microtus subterraneus and *M. liechtensteini* are two sibling species, which differ clearly in their karyotypes, however, isolated molars alone do not allow reliable allocation to the species. The two recent species differ in size (*M. liechtensteini* is bigger), the ranges of m1 length, however, overlap greately (Kryštufek 1997). Subfossil material from Viktorjev spodmol is smaller than any of the recent species from Slovenia (Table 15.7). The m1 length thus suggests the presence of *M. subterraneus* in the subfossil material. Such a conclusion, if correct, is surprising. Namely, only *M. liechtensteini* is known now to populate the vicinity of Viktorjev spodmol, while the range border of *M. subterraneus* is shifted into central Slovenia *ca.* 50 km towards north-west (Kryštufek 1991).

Dinaromys bogdanovi (Martino et Martino, 1922)

Martino's vole was represented by two M2 and a single m3 (Fig. 15.3: l, m). The M2 length of two subfossil specimens (= 2.32 and 2.36, respectively) is within the range of the recent populations from Bosnia & Herzegovina, Croatia, and Kosovo (range=2.09–2.43; mean=2.27; N=30). At present, Martino's vole is a relict species, restricted to the mountains of the Dinaric

Poddružina Murinae Illinger, 1815

Apodemus flavicollis/sylvaticus/agrarius

Rod *Apodemus* Kaup, 1829 je v subfosilnem materialu iz Viktorjevega spodmola zastopan s kar 1.708 meljaki. Glede na njihovo velikost in obliko jih lahko pripišemo trem vrstam: rumenogrli miši *A. flavicollis* (Melchior, 1834), navadni belonogi miši *A. sylvaticus* (Linnaeus, 1758) in dimasti (ognjeni) miši *A. agrarius* (Pallas, 1771). Prisotnost slednje dokazujejo štirje M2, ki so brez mezolabialne grbice (t3; sl. 15.5: a, b), kar je zanesljiv taksonomski znak (Niethammer in Krapp 1978). Z izjemo M2 pa so razlike v morfologiji zob pri omenjenih treh vrstah zelo majhne (Mayhew 1978; Kowalski in Nadachowski 1982; Popov 1989). Ločimo jih lahko predvsem po velikosti, vendar tudi tu prihaja do precejšnjega prekrivanja. Upoštevati je treba tudi veliko geografsko in časovno variabilnost (Pasquier 1974; glej Mayhew 1978). Naši podatki kažejo, da dimenzije M1 omogočajo boljše razlikovanje med recentnima vrstama kot dimenzije m1 (Toškan 2002). Na osnovi dimenzij obeh zob v obravnavanem vzorcu lahko potrdimo prisotnost vseh treh navedenih vrst, pri čemer so ostanki *A. flavicollis* najštevilčnejši (razpredelnica 15.8 in sl. 15.6).

Micromys minutus (Pallas, 1771)

Pritlikavi miši smo pripisali fragment spodnje čeljustnice iz režnja 4. Dolžina maksilarnega zobnega niza (m1-

Razpredelnica 15.7: Opisna statistika za dolžino m1 v petih vzorcih *Microtus subterraneus/liechtensteini*. Homogeni seti temeljijo na Schefféjevem testu. Vzorci: 1 - recentni *M. liechtensteini* iz Slovenije; 2 - recentni *M. subterraneus* iz osrednje Slovenije; 3 - subfosilni vzorec iz Viktorjevega spodmola; 4 - fosilni vzorec iz Divjih bab I (interpleniglacial; OIS 3); 5 - fosilni vzorec iz Divjih bab I (zgodnji glacial; OIS 5). Za razlago glej tabeli 2 in 4. Vrednosti za vzorce 1, 2 in 4 so povzete po Kryštufku (1997).

Table 15.7: Descriptive statistics for m1 length in five samples of *Microtus subterraneus / M. liechtensteini*. Homogeneous sets are based on Scheffé test. Samples: 1 - recent *M. liechtensteini* from Slovenia; 2 - recent *M. subterraneus* from central Slovenia; 3 - subfossil sample from the site Viktorjev spodmol; 4 - fossil sample from Divje babe I (Interpleniglacial; OIS 3); 5 - fossil sample from Divje babe I (Early Glacial; OIS 5). See Tables 15.2 and 15.4 for further explanation. Samples 1, 2 and 4 are from Kryštufek (1997).

Vzorec Sample	N	M	min–max	SD	Homogeni seti Homogeneous sets		
3	51	2,55	2,28–2,30	0,154	X		
2	30	2,65	2,23–2,85	0,129	X	X	
5	9	2,68	2,51–2,93	0,119		X	X
1	33	2,76	2,48–3,15	0,154			X
4	25	2,69	2,39–3,16	0,174			X

Alps and of the Šara-Pindhos range, from the mountain Velebit in the north to the mountain Galičica in the south. The three molars from Viktorjev spodmol are the first Holocene evidence on the species occurrence outside its actual range (Toškan & Kryštufek, in press).

Subfamily Murinae Illinger, 1815

Apodemus flavicollis / sylvaticus / agrarius

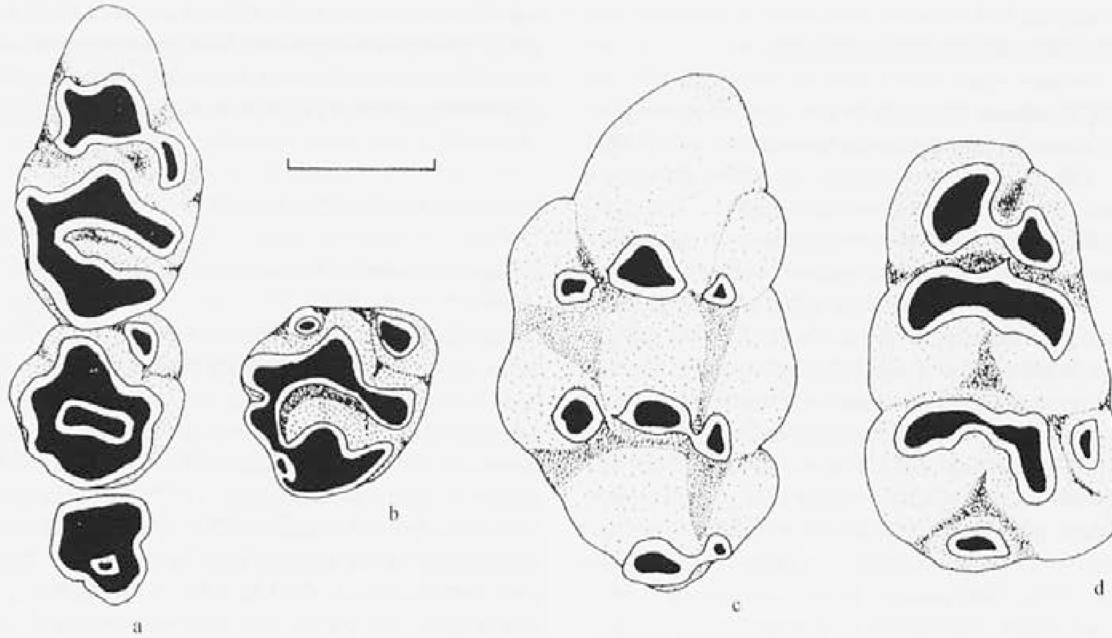
Genus *Apodemus* Kaup, 1829 is represented in the material from Viktorjev spodmol by no less than 1,708 molars. On the basis of their size and morphology we ascribed them to three recent species: yellow-necked mouse *A. flavicollis* (Melchior, 1834), long-tailed field mouse *A. sylvaticus* (Linnaeus, 1758), and striped field mouse *A. agrarius* (Pallas, 1771). *Apodemus agrarius* is represented in the material by four M2, which lack the meso-labial tubercle t3 (Fig. 15.5: a, b); such a condition is diagnostic for the species (Niethammer & Krapp 1978). Differences in the remaining molars are slight (Mayhew 1978; Kowalski & Nadachowski 1982; Popov 1989). The three species differ in size but the ranges, however, overlap broadly. Besides, all species show temporal and spatial variation in size (Pasquier 1974; *cf.* Mayhew 1978). In our results, dimensions of M1 provide better separation than m1 dimensions do (Toškan 2002). Molar size suggests the presence of all three species in Viktorjev spodmol, with *A. flavicollis* being the most common (Table 15.8, Fig. 15.6).

Micromys minutus (Pallas, 1771)

A single mandibular fragment from spite 4 was ascribed to the harvest mouse. Mandibular tooth-row (m1-m3) length (=2.70) is within the range for recent *M. minutus* from the former Yugoslavia (range=2.51-2.85; mean = 2.68; N=17). The same conclusion holds for m1 dimensions (Toškan 2002).

Rattus rattus (Linnaeus, 1758)

The black rat is represented by three isolated molars. Dimensions of m1 from spit 6 fit the values of recent rats from the former Yugoslavia and do not attain the size of the brown rat *R. norvegicus* (Table 15.9). Similarly, the morphology of M1 and m1 (Fig. 15.5: c, d) showed the peculiarities of the black rat (Wolf *et al.* 1980; Pucek 1981). Subfossil black rat material from Viktorjev spodmol is among the earliest evidence for the species in Europe (Toškan & Kryštufek, in press).



Sl. 15.5: Meljaki miši (Murinae) iz Viktorjevega spodmola. (a) Zgornji meljaki *Apodemus agrarius* (reženj 4). (b) 2. zgornji meljak *Apodemus flavicollis/sylvaticus* (reženj 2). Rattus rattus: (c) 1. zgornji meljak (reženj 7); (d) 1. spodnji meljak (reženj 6). Črta ustreza dolžini 1 mm.

Fig. 15.5: Molars of mice and rats (Murinae) from Viktorjev spodmol. (a) upper molars of *Apodemus agrarius* (spit 4). (b) 2nd upper molar of *Apodemus flavicollis/sylvaticus* (spit 2). Rattus rattus: (c) 1st upper molar (spit 7); (d) 1st lower molar (spit 6). Scale bar = 1 mm.

m3) je znašala 2,70 mm. S tem se umešča znotraj variacijske širine za recentno vrsto *M. minutus* iz nekdanje Jugoslavije (variacijska širina=2,51-2,85; povprečje=2,68; N=17). Enako velja za dimenzije prvega spodnjega meljaka (Toškan 2002).

Rattus rattus (Linnaeus, 1758)

Črni podgani pripadajo trije izolirani meljaki. Dimenzije prvega spodnjega meljaka iz režnja 6 se ujemajo z vrednostmi za recentno vrsto *R. rattus* iz nekdanje Jugoslavije in ne dosegajo tistih za recentno *R. norvegicus* z istega območja (razpredelnica 15.9). Tudi v morfologiji se prvi spodnji in prvi zgornji meljak (sl. 15.5: c, d) ne razlikujeta od recentne črne podgane (Wolf *et al.* 1980; Pucek 1981). Subfosilni ostanki črne podgane iz Viktorjevega spodmola predstavljajo eno najstarejših najdb omenjene vrste v Evropi (Toškan in Kryštufek, v tisku).

Družina Gliridae Thomas, 1897

Glis glis (Linnaeus, 1766)

Ostanki navadnega polha obsegajo 258 izoliranih koč-

Family Gliridae Thomas, 1897

Glis glis (Linnaeus, 1766)

The edible dormouse is represented by 258 isolated cheek-teeth. Length of mandibular molars fit the range for recent *G. glis* from Slovenia (N=30). However, specimens from Viktorjev spodmol had significantly narrower m1 than the recent animals (Kruskal-Wallis test: $p < 0.01$). Exclusion from statistical testing of three outliers (*cf.* Fig. 15.7) did not affect the above stated results.

Muscardinus avellanarius (Linnaeus, 1758)

Subfossil remnants of the common dormouse (59 cheek-teeth) were found in spits 8 to 19. Kryštufek (1997) shows that the Upper Pleistocene common dormice from Divje babe I have longer m1 than the recent material from Slovenia. Similarly big are subfossil dormice from Viktorjev spodmol (Fig. 15.8), which attain larger dimensions than a sample of 14 recent specimens from Slovenia (Kruskal-Wallis test $p < 0.001$). Exclusion from the analysis of an outlier from spit 12 did not affect the above stated conclusion.

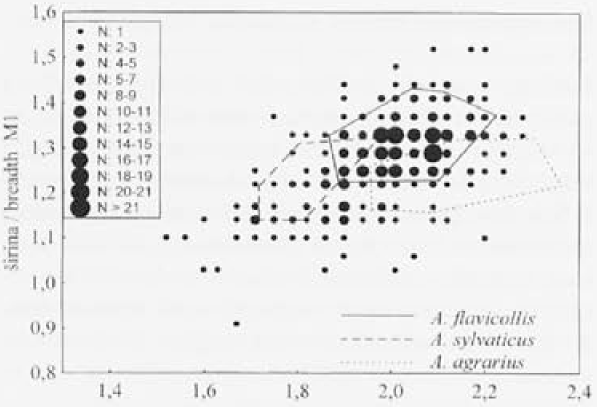
nikov. V dolžini prvih spodnjih meljakov se material iz Viktorjevega spodmola ujema z vrednostmi recentne vrste *G. glis* iz Slovenije (N=30), medtem ko so v širini m1 analizirani subfosilni primerki statistično značilno manjši (Kruskal-Wallisov test: $p<0{,}01$). Takšen rezultat se bistveno ne spremeni, tudi če tri izstopajoče primerke (sl. 15.7) izključimo iz analize.

Razpredelnica 15.8: Opisna statistika za dolžino M1 v šestih vzorcih belonogih miši *Apodemus*. Homogeni seti temeljijo na Schefféjevem testu. Kruskal-Wallisov test (H=210,98) kaže na statistično značilno heterogenost med vzorci (pri $p < 0{,}001$). Številke vzorcev: 1 - recentni *A. epimelas* iz Hrvaške; 2 - recentni *A. agrarius* iz JZ Slovenije; 3 - recentni *A. flavicollis* iz osrednje Slovenije; 4 - recentni *A. sylvaticus* iz osrednje Slovenije; 5 - subfosilni vzorec iz Viktorjevega spodmola (režnji 1-7), 6 - subfosilni vzorec iz Viktorjevega spodmola (režnji 8-19). Za razlago glej tabeli 2 in 4.
Table 15.8: Descriptive statistics for M1 length in six samples of *Apodemus* mice. Homogeneous sets are based on Scheffé test. Kruskal-Wallis test (H= 210.98) denotes significant heterogeneity among samples (at $p < 0.001$). Samples: 1 - recent *A. epimelas* from Croatia; 2 - recent *A. agrarius* from SW Slovenia; 3 - recent *A. flavicollis* from central Slovenia; 4 - recent *A. sylvaticus* from central Slovenia; 5 - subfossil sample from Viktorjev spodmol (spits 1-7); 6 - subfossil sample from Viktorjev spodmol (spits 8-19). See Tables 15.2 and 15.4 for further explanation.

Vzorec Sample	N	M	min–max	SD	Homogeni seti Homogeneous sets
1	34	2,46	2,23–2,60	0,096	X
2	34	2,17	1,98–2,36	0,099	X
3	33	2,03	1,89–2,25	0,081	X X
4	30	1,85	1,75–2,00	0,060	X
5	164	1,96	1,56–2,24	0,130	X
6	328	2,00	1,52–2,28	0,124	X

Razpredelnica 15.9: Opisna statistika za dolžino m1 pri podganah *Rattus*. Vzorci: 1 - recentni *R. rattus* v združenem vzorcu iz Slovenije (N=12), Hrvaške (N=3), Srbije (N=4) ter Črne gore (N=3); 2 - recentni *R. norvegicus* v združenem vzorcu iz Slovenije (N=13), Hrvaške (N=2) in Srbije (N=4); 3 - subfosilni *R. rattus* iz Viktorjevega spodmola (reženj 6). Za razlago glej tabelo 2.
Table 15.9: Descriptive statistics for m1 length in rats *Rattus*. Samples: 1 - recent *R. rattus* in a pooled sample from Slovenia (N=12), Croatia (N=3), Serbia (N=4), and Montenegro (N=3); 2 - recent *R. norvegicus* in a pooled sample from Slovenia (N=13), Croatia (N=2) and Serbia (N=4); 3 - subfossil *R. rattus* from Viktorjev spodmol (spit 6). See Table 15.2 for further explanation.

Vzorec Sample	N	M	min–max
1	22	2,72	2,43–2,93
2	19	3,02	2,87–3,19
3	1	2,85	--



Sl. 15.6: Odnos med širino prvega zgornjega meljaka in njegovo dolžino pri belonogih miših. Poligoni obkrožajo vrednosti 35 recentnih *A. flavicollis* (sklenjena črta) in 35 recentnih *A. sylvaticus* (prekinjena črta) iz osrednje Slovenije (povzeto po Kryštufku 1997) ter 30 recentnih *A. agrarius* (pikčasta črta) iz JZ Slovenije. Pike predstavljajo subfosilne primerke iz Viktorjevega spodmola. N označuje število primerkov.
Fig. 15.6: Scatter diagram plot of breadth of the first upper molar against its length in wood mice. Polygons enclose scores for 35 recent *A. flavicollis* (straigth line), 30 recent *A. sylvaticus* (broken line), both from central Slovenia (after Kryštufek 1997), and 30 recent *A. agrarius* (dotted line) from SW Slovenia. Dots indicate subfossil specimens from Viktorjev spodmol.

Dryomys nitedula (Pallas, 1779)

Ten isolated cheek-teeth belonged to the forest dormouse. Five subfossil m1 from Viktorjev spodmol (range=1.06-1.10; mean=1.07) were well within the range for the recent *D. nitedula* from Slovenia and Croatia (range=1.07-1.14; mean=1.10; N=14).

15.2 Discussion

The subfossil material from Viktorjev spodmol contained at least 827 specimens of small mammals which belonged to at least 29 species from six families (Table 15.10). On the basis of species composition, spits were roughly grouped into two clusters: the upper (spits 1-7) and the lower one (spits 8-19; Fig. 15.9). The lower cluster is archaeologically dated as being of Castelnovian age (*ca.* 8,600 to *ca.* 7,400 yr. BP; Broglio & Improta 1995) while the upper cluster mainly accumulated during the post-Eneolithic Prehistoric times (Turk, this volume).

Because of a somehow isolated position of spits 12, 15, 17, 18, and 19 (*cf.* Fig. 15.9) we also considered the possibility of the existence of a third cluster (mainly containing spits 17-19, but possibly also 15-19). However, after a closer examination of data we rejected this option. The above mentioned spits differed from the rest

Muscardinus avellanarius (Linnaeus, 1758)

Subfosilne ostanke podleska (59 izoliranih kočnikov) smo našli v režnjih 8–19. Kryštufek (1997) navaja, da so v dolžini m1 mlajšepleistocenski primerki iz Divjih bab I statistično značilno večji od recentnih podleskov iz Slovenije. Podobno sliko dajo tudi subfosilni prvi spodnji meljaki iz Viktorjevega spodmola (sl. 15.8), ki prav tako statistično značilno presegajo vrednosti 14-ih recentnih podleskov iz Slovenije (Kruskal-Wallisov test: $p < 0{,}001$). Izstopajoči primerek iz režnja 12 na navedene rezultate bistveno ne vpliva.

Dryomys nitedula (Pallas, 1779)

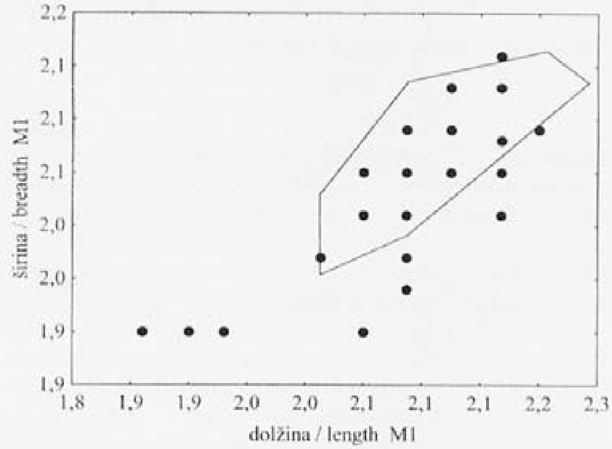
Drevesnemu polhu smo pripisali deset izoliranih kočnikov. V dolžini m1 se pet subfosilnih primerkov iz Viktorjevega spodmola (variacijska širina=1,06–1,10; povprečje=1,07) prekriva z variacijsko širino za recentno vrsto *D. nitedula* iz Slovenije in Hrvaške (variacijska širina=1,07–1,14; povprečje=1,10; N=14).

15.2 Razprava

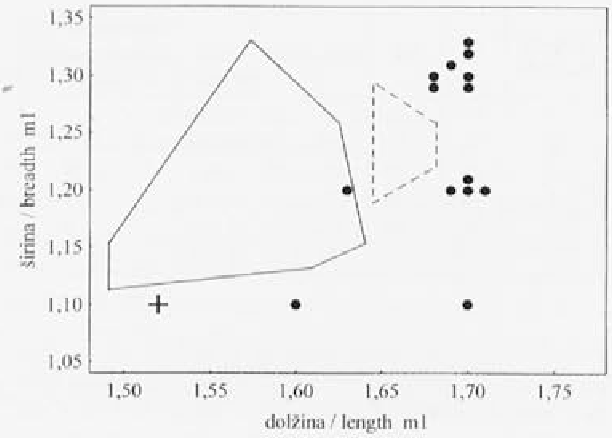
Subfosilno gradivo iz Viktorjevega spodmola obsega ostanke najmanj 827 primerkov malih sesalcev, ki pripadajo vsaj 29 vrstam iz šestih družin (razpredelnica 15.10). Na osnovi vrstne sestave vzorcev iz posameznih režnjev lahko te v grobem združimo v dve skupini: zgornjo sestavljajo režnji 1–7, spodnjo pa režnji 8–19 (sl. 15.9). Spodnja skupina je z arheološkimi najdbami datirana v kastelnovjen (pribl. 8600 do pribl. 7400 let pred sedanjostjo (BP); Broglio in Improta 1995, oziroma od 8140 do 6020 BP; Turk, ta zbornik), medtem ko naj bi se pretežni del sedimenta iz zgornjih sedmih režnjev odložil v prazgodovinskem obdobju, najverjetneje v železni dobi (Turk in Velušček, ta zbornik).

Sprva smo na osnovi nekoliko izolirane lege izkopov 12, 15, 17, 18 in 19 s slike 15.9 razmišljali o oblikovanju še tretje skupine režnjev (tj. 17–19 ali celo 15–19), vendar pa smo po podrobnejši analizi takšno razmišljanje opustili. Odstopanje omenjenih petih režnjev gre namreč pripisati predvsem ostankom netopirjev, dinarske voluharice ter gorske in gozdne rovke, ki jih v drugih režnjih (razen dveh izjem) nismo našli. Našteti taksoni so v navedenih režnjih praviloma zastopani le s po enim fragmentom, samo v enem primeru (reženj 15) pa z več kot dvema (*S. araneus*: NISP=3; MNI=2; gl. tabelo 15.10). Ob tako nizki frekvenci pojavljanja pa seveda ne gre zanemariti možnosti, da je odsotnost omenjenih vrst v drugih vzorcih posledica naključja pri vzorčenju. Še pomembnejši razlog za ohranitev enotne skupine režnjev 8–19 pa vidimo v tem, da je ocena paleookolja na osnovi ekologije vrst, zastopanih v režnjih

mainly in the presence of bats, Martino's vole, bank vole, and common shrew. All these mammals were present in other spits as well, but only exceptionally. On the other hand, all these taxa were represented in spits under con-



Sl. 15.7: Odnos med širino prvega spodnjega meljaka in njegovo dolžino pri navadnem polhu *Glis glis*. Poligon obkroža vrednosti za 30 recentnih *G. glis* iz Slovenije. Pike predstavljajo subfosilne primerke iz Viktorjevega spodmola.
Fig. 15.7: Scatter diagram plot of breadth of the first lower molar against its length in edible dormouse. The polygon enclose scores for 30 recent *G. glis* from Slovenia. Dots indicate subfossil specimens from Viktorjev spodmol.



Sl. 15.8: Odnos med širino prvega spodnjega meljaka in njegovo dolžino pri podlesku *Muscardinus avellanarius*. Poligona obkrožata vrednosti 14 recentnih *M. avellanarius* iz Slovenije (sklenjena črta) in 4 fosilnih *M. avellanarius* iz interpleniglacialnih (OIS 3) plasti Divjih bab I (prekinjena črta). Pike predstavljajo subfosilne primerke iz Viktorjevega spodmola. Križec (+) označuje izstopajoči subfosilni primerek iz Viktorjevega spodmola (reženj 12).
Fig. 15.8: Scatter diagram plot of breadth of the first lower molar against its length in common dormouse. Polygons enclose scores for 14 recent *M. avellanarius* from Slovenia (straigth line) and 4 fossil *M. avellanarius* from Interpleniglacial (OIS 3) layers of Divje babe I (broken line). Dots indicate subfossil specimens from Viktorjev spodmol. The cross (+) indicates the subfossil outlier from Viktorjev spodmol (spit 12).

8-14 in 15-19 v glavnem zelo podobna. Tako ima npr. *Dinaromys bogdanovi* soroden ali celo identičen habitat kot *Chionomys nivalis* (Kryštufek 1987), ki je prisoten skoraj skozi celoten profil. Tudi dve rovki (*Sorex alpinus* in *S. araneus*) sta danes v Sloveniji večinoma sintopični s *S. minutus* (Kryštufek 1991), katere ostanke smo v Viktorjevem spodmolu našli tudi še v režnjih 9, 10 in 12.

V spodnji skupini režnjev (tj. 8-19) je zastopanih kar 27 vrst malih sesalcev. Veliko vrstno pestrost lahko razumemo kot kazalec mile klime (to potrjuje tudi prisotnost krta, vrtne rovke ter toploljubnih netopirjev) in mozaičnega ekosistema (Popov 2000; Janžekovič in Čas 2001). V vzorcu s 37-odstotnim deležem prevladujejo ostanki rodu *Apodemus* (sl. 15.10 a). Na osnovi posameznih izoliranih zob sicer ni mogoče zanesljivo ločiti

sideration mainly by a single remnant each, and only the common shrew achieved higher frequency in spit 15 (NISP=3; MNI=2; *cf.* Table 15.10). Because of such low frequency their absence in other spits was possibly due to a sample bias. Besides, paleoecology of spits 8-14 and 15-19, as deduced from the ecological requirements of individual species, is seemingly not distinct, which provides strong evidence for considering the cluster of spits 8-19 as a single entity. Thus, *Dinaromys bogdanovi* shows similar, if not identical, habitat selection as *Chinomys nivalis* (Kryštufek 1987) which is present throughout nearly the entire profile. The two shrews (*Sorex alpinus* and *S. araneus*) are in Slovenia also mainly syntopic with *S. minutus* (Kryštufek 1991). Remnants of the latter were found in Viktorjev spodmol also in spits 9, 10, and 12.

Razpredelnica 15.10: Najmanjše število osebkov (MNI) v vzorcih iz Viktorjevega spodmola po režnjih. Za vsak reženj je podan volumen (Vol.) sedimenta (frakcije 0,5 do 3 mm), iz katerega so bili pobrani ostanki malih sesalcev. Senčena polja kažejo na prisotnost taksona v režnju.

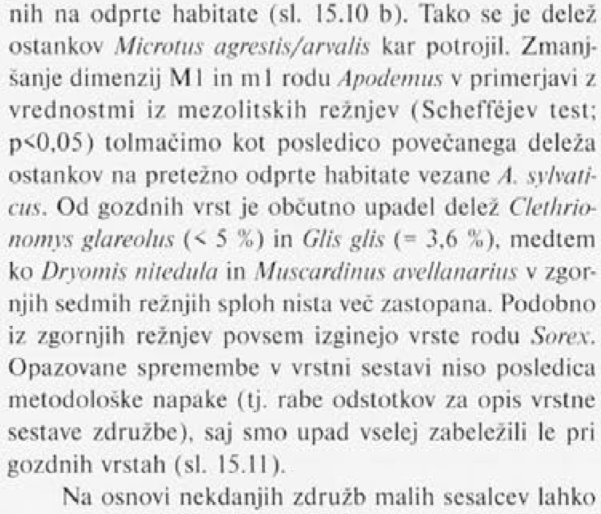
Table 15.10: Minimum Number of Individuals (MNI) in samples from Viktorjev spodmol according to a spit. For each spit is given the volume (Vol.) of a sediment (fractions 0.5 to 3 mm) from which small mammal remnants were collected. Shaded fields show the presence of a taxon in a given spit.

Reženj / Spit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Σ
C. suaveolens											1				1	2				4
C. leucodon			1		1	1			1	1	1			1			1			8
S. minutus												1		1	1		3	3		9
S. alpinus																	1			1
S. araneus															1					1
S. alpinus/araneus																				
T. caeca/europaea	1	1	3	5	1	7	4	3	2	7	1	2		2	1					40
M. emarginatus												1								1
M. blythi																	1			1
P. pipistrellus															1					1
E. serrotinus																	1			1
Chiroptera indet.																				
C. glareolus		1	3	2	1	3	2	3	3	5	3	7	5	3	6	12	21	28	16	124
A. terrestris				1	2	1	1		1	1	1				2	2	2	2	1	17
Ch. nivalis			2	2		1	1									3	3	5	1	18
M. agrestis/arvalis	4	7	12	20	14	7	12	9	4	3	6	6	2	3	4	2	8	14	3	140
M. liecht./subterr.	1		3	1	2	1	3	3	8		3	2	4	2	10	7	5	13	2	70
D. bogdanovi															1			1		2
Arvicolinae indet.																				
C. migratorius																		1		1
A. flav./sylv./agr.	9	9	13	9	16	20	25	13	14	14	15	14	36	20	17	23	21	13	13	314
M. minutus				1																1
R. rattus						1														1
G. glis		1		1	2	2	3	1	2	9	6	9			3	3	3	1		46
D. nitedula								1								1	1		2	5
M. avellanarius								1			1	2	2	2	2	5	2	3	1	21
S. vulgaris										1										1
SKUPAJ / TOTAL	15	19	37	42	39	44	51	34	35	41	38	44	49	34	50	60	72	84	39	827
Vol. (ml)	235	180	275	300	345	415	535	450	375	475	430	555	770	685	635	570	685	535	325	10.030

treh vrst, so pa meritve m1 in M1 pokazale številčno prevlado ostankov na gozd vezane *A. flavicollis* nad *A. sylvaticus* (preferira odprte habitate) in *A. agrarius*, ki je med temi tremi vrstami domnevno najredkejša. Skupaj z ostanki polhov (*Glis glis*, *Dryomys nitedula* in *Muscardinus avellanarius*), rdečezobih rovk (*Sorex alpinus*, *S. minutus* in *S. araneus*) ter *Clethrionomys glareolus* predstavljajo tako na gozd vezane vrste približno 50-odstotni delež vseh ostankov iz mezolitskih režnjev Viktorjevega spodmola (sl. 15.10 a). Z gozdnato pokrajino lahko povežemo tudi *Sciurus vulgaris*.

Paleoekološka slika režnjev 1-7, se precej razlikuje od zgoraj opisane. Predvsem je očiten upad deleža gozdnih vrst (< 30 %), povečal pa se je delež vrst, vezanih na odprte habitate (sl. 15.10 b). Tako se je delež ostankov *Microtus agrestis/arvalis* kar potrojil. Zmanjšanje dimenzij M1 in m1 rodu *Apodemus* v primerjavi z vrednostmi iz mezolitskih režnjev (Schefféjev test; $p<0,05$) tolmačimo kot posledico povečanega deleža ostankov na pretežno odprte habitate vezane *A. sylvaticus*. Od gozdnih vrst je občutno upadel delež *Clethrionomys glareolus* (< 5 %) in *Glis glis* (= 3,6 %), medtem ko *Dryomis nitedula* in *Muscardinus avellanarius* v zgornjih sedmih režnjih sploh nista več zastopana. Podobno iz zgornjih režnjev povsem izginejo vrste rodu *Sorex*. Opazovane spremembe v vrstni sestavi niso posledica metodološke napake (tj. rabe odstotkov za opis vrstne sestave združbe), saj smo upad vselej zabeležili le pri gozdnih vrstah (sl. 15.11).

Na osnovi nekdanjih združb malih sesalcev lahko torej domnevamo, da je v mezolitiku v okolici Viktorjevega spodmola prevladoval listnat oz. mešan gozd. Sklep je konsistenten z izsledki palinoloških analiz. Pelodni



Sl. 15.9: Dvodimenzionalni prikaz končne razporeditve matrike, pridobljene z večdimenzionalnim skaliranjem Jaccardovih koeficientov med 19-imi režnji Viktorjevega spodmola. Najmanjša obtežitev (*stress*) ne presega vrednosti 0,1.

Fig. 15.9: Two dimensional plot of final configuration matrix obtained by Multidimensional scaling of Jaccard's coefficients between 19 spits from Viktorjev spodmol. Numbers indicate spits. Minimum stress does not exceed 0,1.

VIKTORJEV SPODMOL

No less than 27 species were identified in the lower cluster (spits 8-19). High species diversity possibly reflects mild climate (which is evident e.g. by the presence of a mole, lesser white-toothed shrew, and some termophilous bats) and a mosaic structure of the habitat (Popov 2000; Janžekovič & Čas 2001). The most common were the remains of the genus *Apodemus* (= 37 %; Fig. 15.10 a). Although isolated molars were not always ascribable to one of the three species represented in our sample, dimensions of m1 and M1 suggest *A. flavicollis* to be the dominant species. Contrary to *A. sylvaticus*, which prefers open habitats, *A. flavicollis* is a typical forest dweller in Slovenia; *A. agrarius* was evidently rare in the Viktorjev spodmol sample. Together with dormice (*G. glis*, *Muscardinus avellanarius* and *Dryomys nitedula*), reed-toothed shrews (*Sorex alpinus*, *S. minutus* and *S. araneus*), and *Clethrionomys glareolus*, the forest dwelling species comprise *ca.* 50 % of all the remnants in the Mesolithic spits of Viktorjev spodmol (Fig. 15.10 a). Presence of a forest habitat is further proved by *Sciurus vulgaris*.

Paleoecology of spits 1-7 differs significantly from the one described above. The most evident is a decrease in forest dwelling species (< 30 %) with a simultaneous increase in mammals of open habitats (Fig. 15.10 b). Share of *Microtus agrestis / arvalis* showed a three fold increse from the lower cluster to the upper one. Decrease of M1 and m1 size in the genus *Apodemus* (Scheffé test; $p < 0.05$) is interpreted by the increase in a sample of *A. sylvaticus*, which prefers open habitats. Among other forest dwellers, a decrease was documented also in *Clethrionomys glareolus* (< 5 %) and *Glis glis* (= 3.6 %), while *Dryomys nitedula* and *Muscardinus avellanarius* disappeared entirely from the uppermost seven spits. Similarly, all *Sorex* shrews disappeared from the same spits. The above mentioned changes in the species composition are not an artefact of a methodological approach (i.e. using the percentages) since the decline was invariably detected only in the woodland taxa (Fig. 15.11).

Species composition of a small mammal assembly at Viktorjev spodmol during the Mesolithic thus suggests the prevalence of a deciduous forest. Such a conclusion is consistent with the results of palinological studies. Pollen diagramme from a core at Škocjanski zatok near the estuary of the river Rižana near Koper shows the predominance of a deciduous forest and a low share of non-arboreal pollen (Culiberg 1995; Šercelj 1996). Similar conclusions were drawn by Broglio (1980) who studied palinology and faunal remains on the neighbouring Triestine Karst.

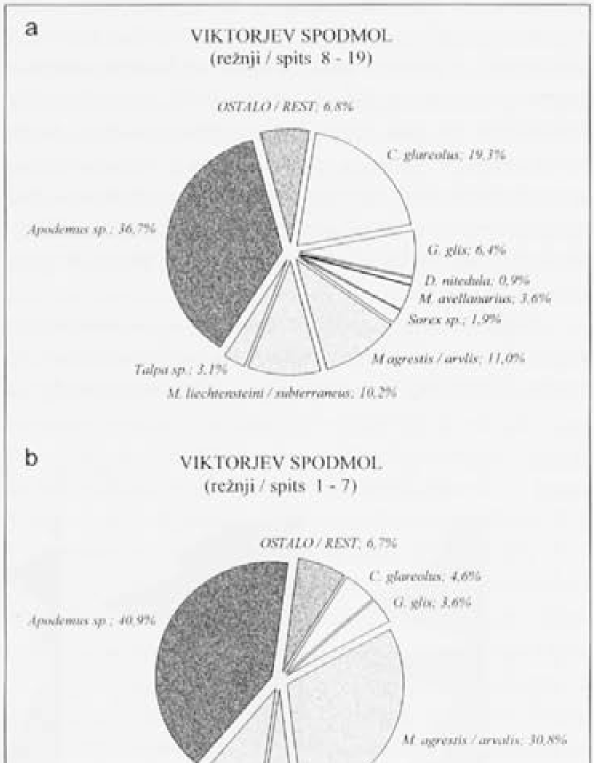
Small mammal assemblies suggest similarly concordant idea on the environment as do pollen and charcoal studies also for the Prehistoric period (Neolithic-Iron Age). Namely, pollen analyses of cores from Škocjanski zatok (Culiberg 1995; Šercelj 1996), Zajezeri-Vodenjak near the village Podgorje (Culiberg 1995), and diagram vrtine Škocjanski zatok ob izlivu reke Rižane blizu Kopra kaže na vodilno vlogo pretežno listnatega gozda, medtem ko je bil delež nedrevesnega peloda (in torej odprtih površin) razmeroma majhen (Culiberg 1995; Šercelj 1996). Podobno je na osnovi palinoloških in favnističnih podatkov ugotovil tudi Broglio (1980) za Tržaški kras.

Do ujemajočih se sklepov smo prišli na osnovi ostankov malih sesalcev in peloda/oglja tudi ob oceni nekdanjega okolja v prazgodovini (tj. neolitik-železna doba). Palinološke analize vrtin Škocjanski zatok (Culiberg 1995; Šercelj 1996), Zajezeri - Vodenjak pri vasi Podgorje (Culiberg 1995) in Prapoče v hrvaški Čičariji (Andrič 2002) ter paleovegetacijske raziskave v okviru najdišč Acijev spodmol (Turk *et al.* 1992) in Podmol pri Kastelcu (Turk *et al.* 1993) namreč vse kažejo na povečan obseg odprtih površin. Enak trend kaže tudi vegetacija v ozadju Sečoveljskih solin (Šercelj 1996). Za navedeno zmanjšanje gozdnih površin je domnevno odgovoren človek (Sala 1977; Biagi *et al.* 1993; Pessina in Rottoli 1996; Boschin in Riedel 2000; Andrič 2002 idr.). Konec mezolitika in nastop neolitika namreč povezujemo z zmanjševanjem pomena lova in nabiralništva ter ustreznim povečevanjem vloge poljedelstva in živinoreje. V istem obdobju je postal Kras tudi geografsko in geopolitično tranzitno ozemlje, saj so postajali trgovski stiki na dolge razdalje med SV Italijo ter osrednjo in vzhodno Evropo povsem običajni (Biagi *et al.* 1993). Zato je bil občasno precej gosto naseljen, to pa je odsevalo tudi v njegovi podvrženosti deforestaciji (Culiberg 1995).

Naravna gozdna vegetacija je bila močno prizadeta predvsem okrog dalj časa trajajočih naselij, kajti poljedelstvo, na Krasu pa predvsem živinoreja, sta terjala obsežno krčenje gozda (Culiberg 1995). Ostanki velikih sesalcev iz Viktorjevega spodmola (Toškan in Dirjec, ta zbornik) kažejo, da je med domačimi živalmi prevladovala drobnica. Ta je imela zelo velik pomen tudi za skupnosti številnih drugih sočasnih najdišč s Krasa, kot so Podmol pri Kastelcu (Turk *et al.* 1992), Acijev spodmol pri Petrinjah (Turk *et al.* 1993), Mitrejeva jama pri Devinu - *Grotta del Mitreo* (Petrucci 1997) in Stenašca pri Praproti - *Grotta dell'Edera* (Boschin in Riedel 2000). Po drugi strani nekoliko manj antropozoogena slika pelodnega diagrama iz Podmola pri Kastelcu kaže na to, da so bili lokalno (npr. na pobočjih Slavnika) domnevno še vedno prisotni gozdovi (Culiberg 1995).

Vzorec iz mezolitskih režnjev Viktorjevega spodmola (tj. režnji 8-19) se v pogledu vrstne sestave skoraj ne razlikuje od sočasnih akumulacij iz različnih najdišč Tržaškega krasa (Bon *et al.* 1991; Bartolomei 2001). Ugotovitev ne preseneča, saj so razdalje med najdišči majhne. Povsem drugačno sliko pa pokaže primerjava subfosilne favne z recentno iz istega območja. Da bi izključili vpliv vzorčenja, smo subfosilno favno primerjali z vzorcem izbljuvkov lesne sove. Ti so bili pobrani v

Prapoče in the Croatian part of Čičarija (Andrič 2002), as well as paleovegetation studies at sites Acijev spodmol (Turk *et al.* 1992) and Podmol pri Kastelcu (Turk *et al.* 1993) invariably detected an increase in open habitats. Šercelj (1996) demonstrates similar trend also in vegetation near Sečoveljske soline. Shrink in forests was presumably due to human activity (Sala 1977; Biaggi *et al.* 1993; Pessina & Rottoli 1996; Boschin & Riedel 2000; Andrič 2002, etc.). The end of the Mesolithic and start of the Neolithic coincide with the decreased importance of hunting and food gathering but with an adequate increase in agricultural activity and in livestock breeding. During the same period Kras became a geographic



Sl. 15.10: Relativna pogostnost ostankov posameznih taksonov malih sesalcev iz mezolitskih (a) in prazgodovinskih (b) sedimentov Viktorjevega spodmola. Deleži so izračunani kot količnik med MNI posamezne vrste in MNI vseh vrst v obravnavanem obdobju prisotnih vrst. Delež na odprte habitate vezanih vrst je obarvan s sivo, vezanih na gozd pa z belo. Kompleks *Apodemus flavicollis/sylvaticus/agrarius* je označen s črno.

Fig. 15.10: Relative abundance of each several small mammals' taxons from Mesolithic (a) and Prehistoric (b) sediments of Viktorjev spodmol. Shares are calculated as quotients of MNI of each several taxon from Mesolithic or Prehistoric sediments as denominator against the MNI of all species from the same period. The share of open area dwellers is showed in grey and that of forrest-associated small mammals in white. The share of the complex *Apodemus flavicollis/sylvaticus/agrarius* is black.

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Sokolaku pri Škocjanskih jamah, nedaleč od Viktorjevega spodmola (Lipej in Gjerkeš 1996).

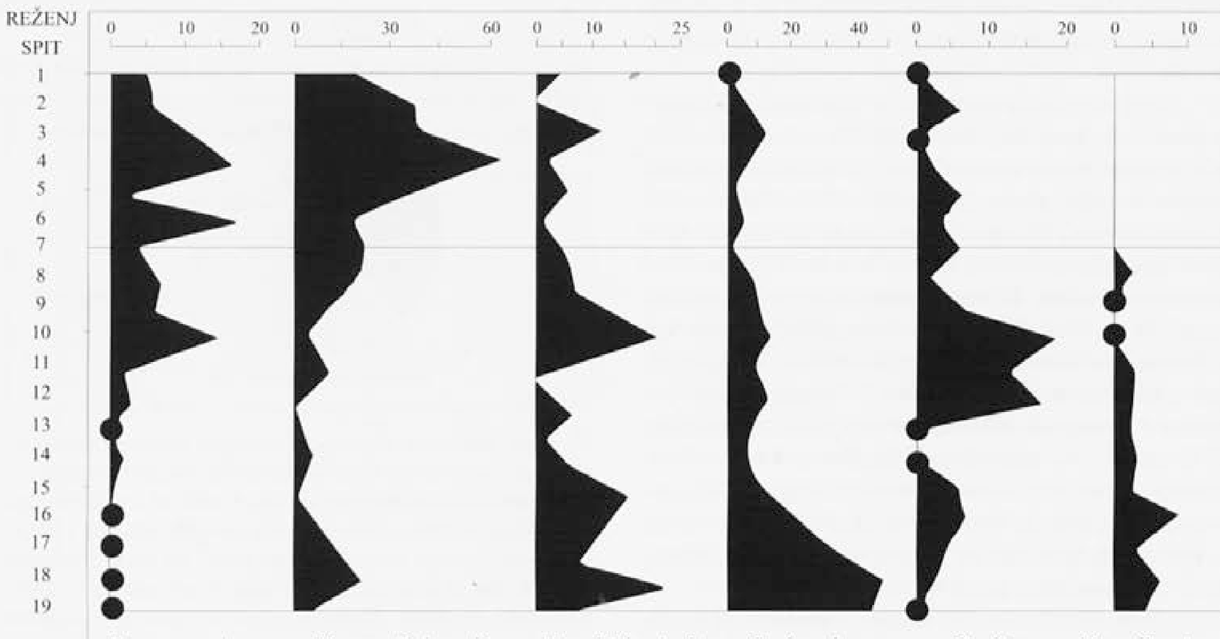
Kot je razvidno s slike 15.12 se recentna favna očitno razlikuje ne le od mezolitske (Viktorjev spodmol: režnji 8–19; najdišča Tržaškega krasa), temveč tudi od prazgodovinske (Viktorjev spodmol: režnji 1–7). Opažanja lahko vsaj deloma razložimo z vegetacijskimi spremembami na Krasu v zadnjih 7000 letih, torej z antropozoogenim krčenjem gozda (Šercelj 1996; Andrič 2002). Kot navedeno, lahko omenjenemu dejavniku najverjetneje pripišemo že razlike v vrstni sestavi vzorcev iz mezolitskih in prazgodovinskih režnjev Viktorjevega spodmola. V zadnjih 3000 letih pa se je obseg človekovega posega v okolje še dodatno povečal. Na Krasu je ekonomija temeljila predvsem na reji drobnice. Tako so paša, krčenje grmičevja in namerni požigi gozdov v kombinaciji s poletno sušo, sprožili velike spremembe v vegetaciji in erozijo tal (Culiberg 1995; Šercelj 1996), posledično pa tudi zmanjšanje vrstne pestrosti favne malih sesalcev. Tako ne preseneča, da je sestava vzorca iz prazgodovinskih režnjev Viktorjevega spodmola bolj podobna recentni favni iz notranjosti Slovenije (Ljubljansko barje; Kryštufek 1980) kot pa tisti, ki danes poseljuje Kras (sl. 15.12).

Naši rezultati so v skladu s sklepi o osiromašenju vrstne diverzitete malih sesalcev na mediteranskem območju Dinaridov kot posledici človekove degradacije

and geopolitical node in a transit as trade between the north-eastern Italy and central and eastern Europe intensified to such an extant to become a common practice (Biaggi *et al.* 1993). Because of the above mentioned reasons, Kras used to be fairly densely populated already in the Prehistoric period, which only accelerated the deforestation (Culiberg 1995).

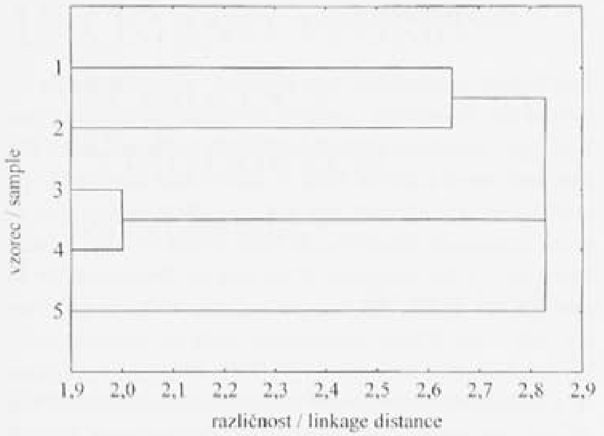
Because agriculture and even more so livestock breeding resulted in extensive deforestation, the natural forest vegetation was most strongly affected around the more permanent settlements (Culiberg 1995). Large mammal remnants from Viktorjev spodmol (Toškan & Dirjec, this volume) show that Caprinae were the most common domestic animals. Sheep and goat were of prime importance also for a number of other contemporary sites on Kras, e.g. Podmol near Kastelec (Turk *et al.* 1992), Acijev spodmol near Petrinje (Turk *et al.* 1993), Mitrejeva jama (*Grotta del Mitreo*; Petrucci 1997), and Stenašca near Praprot (*Grotta dell'Edera*; Boschin & Riedel 2000). Pollen diagramme from Podmol near Kastelec, on the other hand, shows less anthropo-zoogenic impact on the environment thus suggesting forests to be locally present on more remote sites, e.g. on the slopes of the mountain Slavnik (Culiberg 1995).

Mesolithic small mammal assembly from Viktorjev spodmol (spits 8–19) does not differ in its species composition from contemporary accumulations in various



Sl. 15.11: Najmanjše število osebkov (MNI) nekaterih bolje zastopanih taksonov malih sesalcev iz Viktorjevega spodmola, preračunano na enoten volumen sedimenta frakcije velikosti 0,5 do 3 mm na reženj (tj. 1000 ml). Pike označujejo režnje, v katerih je bila dan takson sicer zastopan (tj. NISP > 0), vendar je bil MNI=0. Za globine režnjev glej razpredelnico 5.1 (Turk, ta zbornik).

Fig. 15.11: Minimum number of individuals (MNI) for some of the most abundant small mammals' taxons from Viktorjev spodmol, calculated for the unit volume of sediment fraction of particles 0.5–3.0 mm for each spit (i.e. 1000 ml). Dots indicate spits, where remnants of a taxon were found (i.e. NISP > 0), although MNI=0.



Sl. 15.12: Dendrogram, ki povzema na evklidskih razdaljah temelječo matriko različnosti med tremi subfosilnimi in dvema recentnima združbama malih sesalcev. Številke vzorcev: 1 - Tržaški kras (mezolitik): Pečina na Leskovcu pri Samatorci - *Grotta Azzurra*, Pečina Podkičer pri Trebčah - *Grotta di Trebiciano*, "Pečina Lonza" pri Repnu - *Grotta Lonza* (vsi Bon *et al.* 1991) in Ciganska jama pri Breščikih - *Grotta degli Zingari* (Bartolomei 2001); 2 - Viktorjev spodmol (režnji 8-19; mezolitik); 3 - Viktorjev spodmol (režnji 1-7; prazgodovina); 4 - Ljubljansko barje (recentno): Kozlarjeva gošča, Bevke in Sarsko (Kryštufek 1980); 5 - Sokolak pri Škocjanskih jamah (recentno; Lipej in Gjerkeš 1996).

Fig. 15.12: Dendrogram summarising dissimilarities matrix based on Euclidean distances for three subfossil and two recent small mammal assemblages. Identifying numbers of samples: 1 - Triestine Kart (Mesolithic): the Pečina na Leskovcu near Samatorca (*Grotta Azzurra*), Podkičer cave near Trebče (*Grotta di Trebiciano*),"Pečina Lonza" at Repno (*Grotta Lonza*; all Bon *et. al.* 1991) and Ciganska jama near Breščiki (*Grotta degli Zingari*; Bartolomei 2001); 2 - Viktorjev spodmol (spits 8-19; Mesolithic); 3 - Viktorjev spodmol (spits 1-7; Prehistory); 4 - Ljubljansko barje (recent): Kozlarjeva gošča, Bevke and Sarsko (Kryštufek 1980); 5 - Sokolak near Škocjanske jame (recent; Lipej & Gjerkeš 1996).

habitatov v holocenu (Kryštufek in Griffiths 1999). Proces je bil v Sredozemlju očitno splošno razširjen in ga je npr. za Izrael dokumentiral tudi Tchernov (1968). Po drugi strani pa lokalnega izumrtja v jugozahodni Sloveniji najmanj dveh vrst (*Cricetulus migratorius* in *Dinaromys bogdanovi*) ne moremo razložiti z degradacijo okolja. Očitno je bila degradacija habitatov resda najpomembnejši, ne pa tudi edini dejavnik, ki je vplival na vrstno sestavo v združbi malih sesalcev v holocenu.

Zahvala:

Zahvaljujeva se Ivanu Turku, ki nama je odstopil v obdelavo gradivo, zbrano med izkopavanji v Viktorjevem spodmolu. Hvaležna sva Janezu Dirjecu, ki ga je sortiral in pripravil za nadaljnjo obdelavo. B. Toškan je opravil delo v okviru podiplomskega usposabljanja, ki ga financira Ministrstvo za šolstvo, znanost in šport.

parts of Triestine Karst (Bon *et al.* 1991; Bartolomei 2001). Such a conclusion does not pose as a surprise since all the localities are close to each other. However, very different picture is obtained when the subfossil fauna is compared to the recent one. To minimise the sampling error we compared the subfossil fauna with a tawny owl pellet sample collected at Sokolak near Škocjanske jame, not far from Viktorjev spodmol (Lipej & Gjerkeš 1996).

Recent small mammal assembly differs from the Mesolithic ones (spits 8-19 from Viktorjev spodmol but also other Triestine Karst sites) as well as from that of the Prehistoric period (spits 1-7 from Viktorjev spodmol). Such differences could be attributed, at least partly, to the vegetation changes during the last seven millennia in Kras, i.e. by an anthropo-zoogenic deforestation (Šercelj 1996; Andrič 2002). As already stated, deforestation was presumably the main factor responsible already for the impoverishment in small mammal species richness from the Mesolithic to the Prehistoric period. However, the human impact increased even more profoundly following next millennia. Economy in Kras continued to be based mainly on Caprinae breeding. Pastural economy associated with shrub removal and intentional forest burning resulted, together with summer draughts, in significant changes in vegetation and in soil erosion (Culiberg 1995; Šercelj 1996). Habitat degradation also caused a sharp decrease in small mammal species richness. It is thus not surprising that the small mammal fauna from Prehistoric spits of Viktorjev spodmol more closely resembles the recent fauna from central Slovenia (Ljubljansko barje; Kryštufek 1980) than the present fauna of Kras (Fig. 15.12).

Our results are compatible with the suggested impoverishment in species composition of the small mammal assemblies in the Mediterranean part of the Dinaric Alps as a result of human caused habitat degradation during the Holocene (Kryštufek & Griffiths 1999). The process was evidently widespread in the Mediterranean and is documented e.g. for Israel by Tchernov (1968). On the other hand, local extirpation in southwestern Slovenia of at least two species (*Cricetulus migratorius* and *Dinaromys bogdanovi*) can not be explained in the same way. Evidently, habitat degradation was the most important but not the only clue which shaped the small mammal species composition along the Mediterranean coast during the Holocene.

Acknowledgements:

We thank Ivan Turk for forwarding for further elaboration the material, which resulted from the excavations at Viktorjev spodmol which he superintended. Acknowledgements are extended to Janez Dirjec for sorting the material. B. Toškan performed this research while receiving grant for a post-graduate training from the Ministry of education, science and sport.

15.3 Dodatek

Neposredno pred predajo besedila v tisk smo dobili v določitev tudi ostanke malih sesalcev iz Viktorjevega spodmola, ki so bili pobrani z najbolj grobega sita (velikost luknjic 3 mm). Nove najdbe so za 5,2 odstotka povečale skupno število (vsaj) do nivoja rodu določljivih ostankov malih sesalcev. Zaradi časovne stiske dodatnega vzorca (še) ni bilo mogoče celostno analizirati, zato na tem mestu podajamo le seznam zastopanih taksonov s pripadajočim številom določenih primerkov (NISP). Z izjemo fragmentirane spodnje čeljustnice navadnega netopirja *Myotis myotis* (Borkhausen, 1797) iz režnja 19 so v novopridobljenem vzorcu zastopane izključno vrste, katerih ostanke smo našli tudi že v sedimentni frakciji velikosti 0,5 do 3 mm. Poleg tega kaže opozoriti na veliko podobnost med obema vzorcema tudi v kvantitativnem razmerju med ostanki gozdnih (prevladujejo v režnjih 8-19) in na odprte habitate vezanih vrst (številčnejši v režnjih 1-7), kar nedvomno potrjuje v prispevku predstavljeno paleookoljsko podobo Krasa v mezolitiku in poznejših prazgodovinskih obdobjih.

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15.3 Supplement

Just before sending the text to print, we additionally received the identified remains of small mammals from Viktorjev spodmol, which had been collected with the coarsest sieve (size of hole 3 mm). The new finds increased by 5.2 percent the total number of remains of small mammals identified at least to the level of genus. Because of time pressure, it has not yet been possible to analyse the additional sample entirely so here we provide only a list of taxa represented, with the relevant number of identified specimens (NISP). With the exception of a fragmented lower jaw of greater mouse-eared bat (*Myotis myotis* (Borkhausen, 1797)) from spit 19, the newly obtained sample contained exclusively species whose remains had already been found in the sedimentation fraction of size 0.5 mm to 3 mm. In addition, it is worth highlighting the great similarity between the two samples, in terms of the quantitative ratio between remains of forest (predominating in spits 8-19) and open habitat species (more numerous in spits 1-7). The latter undoubtedly confirms the paleo-environmental appearance of the Kras in Mesolithic and later Prehistoric periods presented in the contribution.

Razpredelnica 15.11: Število določenih primerkov (NISP) posameznih taksonov malih sesalcev, zastopanih v vzorcu iz Viktorjevega spodmola, pobranem na situ z velikostjo luknjic 3 mm. Podan je tudi volumen sedimenta, iz katerega so bili ostanki malih sesalcev pobrani.

Table 15.11: Number of identified specimens (NISP) of individual taxa of small mammals represented in the sample from Viktorjev spodmol, collected in a sieve with size of hole 3 mm. The volume of sediment from which the remains of small mammals were collected is also given.

Takson / Taxon	**Režnji / Spits 1-7 NISP**	**Režnji / Spits 8-19 NISP**	**SKUPAJ / TOTAL NISP**
Erinaceus sp.	2	--	2
C. suaveolens	--	1	1
S. alpinus / araneus	--	2	2
Talpa europaea / caeca	32	11	43
Myotis myotis	--	1	1
S. vulgaris	1	1	2
C. migratorius	--	4	4
G. glis	1	3	4
A. terrestris	9	21	30
M. agrestis / arvalis	4	6	10
M. subterraneus / liecht.	1	1	2
Ch. nivalis	--	15	15
C. glareolus	3	22	25
D. bogdanovi	--	2	2
Apodemus flav./sylv./agr.	15	37	52
SKUPAJ / TOTAL	68	127	195
Vol. (l)	480 (= 41,0 %)	690 (= 59,0 %)	1170 (= 100 %)

16. Ostanki velikih sesalcev v Vikotrjevem spodmolu

16. Remains of Large Mammals in Viktorjev Spodmol

Borut Toškan & Janez Dirjec

V okviru sondiranja najdišča Viktorjev spodmol pri Škocjanskih jamah se je, poleg drugega, nabralo tudi 12.376 ostankov velikih sesalcev. Vsaj do nivoja rodu jih je bilo mogoče določiti 584 (tj. 4,7 %) in te smo pripisali 22-im vrstam iz osmih družin (razpredelnica 16.1). Z izjemo losa in izumrlega tura lahko vse navedene vrste v Sloveniji najdemo še danes. Sicer pa lahko izkopani sediment časovno umestimo v dve obdobji: starejše je z arheološkimi najdbami datirano v kastelnovjen (*castelnovien*; pribl. 8600 do pribl. 7400 let pred sedanjostjo (BP); Broglio in Improta 1995, oziroma od 8140 do 6020 BP; Turk, ta zbornik), medtem ko naj bi se pretežni del usedlin iz mlajše faze odložil v prazgodovinskem obdobju, najverjetneje v starejši železni dobi (Turk in Veluščck, ta zbornik).

Obravnavani osteodontološki material je bil zbran v treh zaporednih fazah izkopavanj, pri katerih so bile uporabljene različne tehnike in metode (glej Turk, ta zbornik). Sprva je bilo opravljeno klasično izkopavanje s sprotnim pregledovanjem usedlin na terenu brez spiranja (faza Viktor), sledilo je spiranje in rutinsko pregledovanje že odkopanih usedlin (faza Viktor in IzA), ob koncu pa je bilo izvedeno še mini stratigrafsko izkopavanje (osnovna enota kvadrat 0,2 x 1 m; reženj debeline 5 cm) s spiranjem in večkratnim pregledovanjem spranih usedlin (faza IzA). Pri spiranju so bila uporabljena sita z velikostjo luknjic 3 mm, 1 mm in 0,5 mm. Upoštevaje te kriterije smo v tri sklope razdelili tudi izkopane ostanke (razpredelnica 16.1).

Pri določitvi subfosilnih kostnih in zobnih elementov so nam bili v pomoč fosilni in recentni primerjalni material iz Slovenije (zbirki Inštituta za arheologijo ZRC SAZU in Katedre za paleontologijo NTF Univerze v Ljubljani) ter podatki iz literature (npr. Boessneck 1972; Schmid 1972; Payne 1985; Prummel in Frisch 1986; Hillson 1986; 1992). Določali smo ostanke vseh skeletnih elementov z izjemo reber ter večine vretenc; od slednjih smo determinirali le *atlas* in *epistropheus*. Med pregledovanjem materiala smo beležili tudi primerke s sledovi zverskih zob in človekovega delovanja (vrezi, zasekanine, ožganost). Ocene starosti živali ob zakolu/uplenitvi so temeljile na analizi obrabe zob (Habermehl 1961; Payne 1973; 1987; Rolett in Chiu 1994) ter na deležu fragmentov z nezraščenima epi- in diafizo (Silver 1972;

Within the framework of the test excavation of Viktorjev spodmol by Škocjanske jame (Škocjan Caves), in addition to other finds, 12,376 remains of large mammals were collected. Of these, 584 (i.e. 4.7%) could be identified at least to the level of genus and were ascribed to 22 species from eight families (Table 16.1). With the exception of elk and the now extinct aurochs, all the mentioned species can be still found in Slovenia today. The excavated sediments can be placed in two time periods: the older is dated with archaeological finds to the Castelnovian (approx. 8600 to approx. 7400 BP); Broglio in Improta 1995, or from 8140 to 6020 BP; Turk, this volume), while the predominant part of the sediments from the younger phase were deposited in the Prehistoric period, probably in the Early Iron Age (Turk and Velušček, this volume).

The osteodontological material dealt with was collected in three successive phases of excavation, in which different techniques and methods were used (see Turk, this volume). At first, classical excavation was performed with simultaneous examination of the sediments in the field without sieving (Viktor phase), followed by wet sieving and routine examination of the already excavated sediments (Viktor and IzA phase). Finally a mini stratigraphic excavation was performed (basic unit 0.2 x 1 m; thickness of spits 5 cm) with wet sieving and multiple examination of the sieved sediments (IzA phase). For sieving, screens with hole sizes of 3 mm, 1 mm and 0.5 mm were used. The excavated remains were divided into the three phases taking into account these criteria (Table 16.1).

In the identification of sub-fossil remains and teeth elements, we were assisted by fossil and recent comparative material from Slovenia (collections of the Institute of Archaeology ZRC SAZU and the Department of Palaeontology of the NTF, University of Ljubljana) and data from the literature (e.g. Boessneck 1972; Schmid 1972; Payne 1985; Prummel and Frisch 1986; Hillson 1986; 1992). We identified the remains of all skeletal elements with the exception of ribs and the majority of vertebrae; of the latter, we identified only *atlas* and *epistropheus*. Among the material examined, we also recorded specimens with gnawing marks and traces of human action (cut marks, chop marks, bur-

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Moran in O'Connor 1994). Pri biometrični analizi smo upoštevali smernice, ki jih je objavila Von Driescheva (1976). Ob tem kaže poudariti, da dimenzije posameznih skeletnih elementov (glej prilogo) in podatke o starostni strukturi v vzorcu zastopanih živali podajamo le informativno. Skromno število najdb namreč ne dopušča oblikovanja reprezentativnih vzorcev, ki bi v zadovoljivi meri povzemali intraspecifično variabilnost obravnavanih populacij.

Kvantitativne primerjave med taksoni temeljijo na številu določenih primerkov (*Number of Identified Specimens*, NISP). Kljub nekaterim šibkim točkam, ki jih NISP vsekakor ima (glej npr. Klein in Cruz-Uribe 1993), se namreč zdi uporaba bolj sofisticiranih kazalcev abundance v primeru tako skromnih vzorcev manj primerna alternativa. Pri statističnih analizah smo uporabljali neparametrične prijeme (Spearmanov r, χ^2-test, Mann-Whitneyjev U-test; StatSoft, Inc. 2001), saj podatki niso normalno porazdeljeni, kršena pa je tudi homogenost

ning). Assessments of the age at death of the animals were based on analysis of tooth wear (Habermehl 1961; Payne 1973; 1987; Rolett and Chiu 1994) and on the share of fragments with unfused epi- and diaphyses (Silver 1972; Moran and O'Connor 1994). In biometric analysis, we followed the guidelines published by Von Driesch (1976). It is worth stressing that the dimensions of individual skeletal elements (see annexes) and data on the age structure of animals represented in the sample are given only informatively. The modest number of finds, namely, does not allow the formation of representative samples which would satisfactorily summarise the intra-specific variability of the populations treated.

Quantitative comparisons between taxa are based on the number of identified specimens (NISP). Despite some weak points which NISP certainly has (see e.g., Klein and Cruz-Uribe 1993), the use of more sophisticated indicators of abundance in the case of such modest samples seems a less suitable alternative. With sta-

Razpredelnica 16.1: Število določenih primerkov (NISP) posameznih taksonov velikih sesalcev, zastopamih v Viktorjevem spodmolu, za vsako od treh faz izkopavanj. Identifikacija simbolov: vzorec 1 - faza Viktor, vzorec 2 - faza Viktor in IzA in vzorec 3 - faza IzA. Za obrazložitev glej besedilo.
Table 16.1: Number of identified specimens (NISP) of individual taxa of large mammals represented in Viktorjev spodmol, for each of the three phases of excavation. Identification of symbols: sample 1 -Viktor phase, sample 2 -Viktor and IzA phase and sample 3 -IzA phase. See text for explanation.

Takson / Taxon	Vzorec / Sample 1		Vzorec / Sample 2		Vzorec / Sample 3		SKUPAJ / TOTAL	
	NISP	% NISP	NISP	% NISP	NISP	%NISP	NISP	% NISP
Cervus elaphus	84	38,0	10	11,1	74	27,3	168	28,8
Sus sp.	56	25,2	15	16,7	76	27,6	147	25,3
Lepus europaeus	15	6,8	30	33,3	58	21,2	103	17,6
Meles meles	10	4,5	5	5,6	15	5,5	30	5,1
Ovis s. *Capra*	5	2,3	6	6,7	12	4,4	23	3,9
Ovis aries	4	1,8			2	0,7	6	1,0
Capra hircus	2	0,9					2	0,3
Vulpes vulpes	8	3,6	9	10	5	1,8	22	3,8
Capreolus capreolus	8	3,6	3	3,3	10	3,7	21	3,6
Bos taurus	10	4,5			1	0,4	11	1,9
Bos cf. *primigenius*	4	1,8					4	0,7
Bos sp.					1	0,4	1	0,2
Felis sp.	6	2,7	4	4,4	2	0,7	12	2,0
Canis familiaris	1	0,5			7	2,6	8	1,4
Ursus arctos	3	1,4	5	5,6	1	0,4	9	1,5
Martes sp.	3	1,4	3	3,3	6	2,2	12	2,0
Lutra lutra	1	0,5			1	0,4	2	1,0
Alces alces					1	0,4	1	0,3
Lynx lynx	1	0,5					1	0,2
Mustela putorius					1	0,4	1	0,2
SKUPAJ / TOTAL NISP	221	100	90	100	273	100	584	100
N vseh fragmentov N of all fragments	640		5.294		6.442		12.376	
% določljivega % determinable	34,5 %		1,7 %		4,2 %		4,7 %	

variance. Statistična obdelava je bila narejena s programskim paketom StatSoft 2001, STATISTICA za Windows, verzija 6.0.

V besedilu označujemo kočnike kot: P - predmeljaki, M - meljaki; velike tiskane črke označujejo gornje zobe, male pa spodnje. Položaj posameznega meljaka v zobnem nizu je označen s številko (anteriorno → posteriorno).

16.1 Taksonomija

Red: Zajci in žvižgači (Lagomorpha)
Družina: Zajci in kunci (Leporidae)

Lepus europaeus Pallas, 1778

Gradivo:

- Faza Viktor, plast s keramiko: humerus (1 fragment), femur (4 fr.), tibia (1 fr.); premešano: mandibula (2 fr.), dens (2), calcaneus, ulna (1 fr.), phalanx I
- Faza Viktor in IzA: dens (2), humerus (1 fr.), ulna (1 fr.), metacarpus, ossa coxae (1 fr.), tibia (1 fr.), os tarsale, metatarsus (7 fr.), metapodium (5 fr.), phalanx I (4), phalanx II (4)
- Faza IzA: 58 ostankov (gl. razpredelnico 16.2)

Ostanki poljskega zajca zasedajo s 17,6-odstotnim deležem tretje mesto med vsemi taksoni, zastopanimi v Viktorjevem spodmolu (razpredelnica 16.1). V zgornjih (prazgodovinskih) režnjih stratigrafskega izkopavanja profila Viktorjeve sonde (tj. faza IzA) je zajec s 40-odstotnim deležem celo daleč najbolje zastopana vrsta (sl. 16.5b). Dolge kosti so praviloma zdrobljene, nismo pa zasledili nikakršnih sledov vrezov, zasekanin ali zverskih zob.

Zaradi odsotnosti nepoškodovanih dolgih kosti smo se pri determinaciji srečali s problematiko ločevanja med poljskim zajcem in kuncem *Oryctolagus cuniculus* Lin-

Sl. 16.1: Spodnja čeljustnica (lateralno) poljskega zajca *Lepus europaeus* iz Viktorjevega spodmola (faza IzA: reženj 5). Merilo je podano v cm. Foto M. Grm.
Fig. 16.1: Mandible (lateral aspect) of hare *Lepus europaeus* from Viktorjev spodmol (IzA phase: spit 5). Measurements are given in cm. Photo M. Grm.

tistical analyses, we used non-parametric techniques (Spearman's r, χ^2-test, Mann-Whitney U-test; StatSoft, Inc. 2001), since data are not normally distributed, and the homogeneity of variance is also infringed. Statistical processing was done with the software StatSoft 2001, STATISTICS for Windows, version 6.0.

In the text we characterise cheek-teeth as: P - premolars, M - molars; capitals signify upper teeth, small letters lower teeth. The number denotes the position of a particular tooth in the tooth-row (anterior → posterior).

16.1 Taxonomy

Order: Rabbits and Pikas (Lagomorpha)
Family: Rabbits and Hares (Leporidae)

Lepus europaeus Pallas, 1778

Material:

- Viktor phase, layer with pottery: humerus (1 fragment), femur (4 fr.), tibia (1 fr.); mixed: mandibula (2 fr.), dens (2), calcaneus, ulna (1 fr.), phalanx I
- Viktor and IzA phase: dens (2), humerus (1 fr.), ulna (1 fr.), metacarpus, ossa coxae (1 fr.), tibia (1 fr.), os tarsale, metatarsus (7 fr.), metapodium (5 fr.), phalanx I (4), phalanx II (4)
- IzA: 58 remains (see Table 16.2)

Remains of hare, with a 17.6 percent share, occupy third place among all taxa represented in Viktorjev spodmol (Table 16.1). In the upper (Prehistoric) spits of the stratigraphically excavated profile of Viktor's test trench (i.e. IzA phase) hare, with a 40 percent share, is even by far the most represented species (Fig. 16.5b). Long bones are generally fragmented, but we found no trace of cuts, chop marks or gnawing.

Because of the absence of undamaged long bones, we had difficulty distinguishing between hare and rabbit *Oryctolagus cuniculus* Linnaeus, 1758. Clutton-Brock (1999) suspects that the rabbit was only introduced to central Europe from the Pyrenean peninsular by the Romans, on the basis of which its presence in Mesolithic and Prehistoric layers of Viktorjev spodmol would be excluded. The only sufficiently well preserved mandible (IzA phase: spit 5) corresponds morphologically with hare (Fig. 16.1; Kryštufek 1991) and is thus in full agreement with this. The same is true for the length of the tooth-row of the aforementioned specimen (i.e. 18 mm), which lies within the range seen in recent *L. europaeus* (17-20 mm; Lavocat 1966) and thus exceeds values for recent *O. cuniculus* (11-16 mm; Lavocat 1966). In the Mesolithic layers of Pečina na Leskovcu (*Grotta Azzurra*; *Cremonesi et al.* 1984) on the Triestine Karst and Pečina pri Bjarču (*Riparo di Biarzo*; Rowley-Conwy 1996) in the valley of the Nadiža (Natisone), two frag-

VIKTORJEV SPODMOL

Razpredelnica 16.2: Število določenih primerkov (NISP) za vsakega od taksonov velikih sesalcev, zastopanih v Viktorjevem spodmolu po skeletnih elementih. Podatki se nanašajo izključno na ostanke iz faze IzA.
Table 16.2: Number of identified specimens (NISP) for each taxon of large mammal represented in Viktorjev spodmol by skeletal elements. Data refer exclusively to remains from the IzA phase.

Takson Taxon	rog / antler	cranium	os maxillare	mandibula	dens	epistropheus	scapula	humerus	radius	ulna	carpalia	metacarpalia	phalanx I	phalanx II	phalanx III	ossa sesamoidea	os coxae	femur	patella	tibia	fibula	calcaneus	astragalus	ostali tarsalia	metatarsalia	indet. metapodium	SKUPAJ TOTAL
L. europaeus		1		2	5	1		2	1				7	6	1	1		2		5		2	3	7	9	3	58
M. meles				2	9			1				1	1												1		15
M. putorius											1																1
Martes sp.					2			2				1										1					6
L. lutra					1																						1
V. vulpes					3									1				1									5
C. familiaris					2					1			1	2	1												7
U. arctos												1															1
Felis sp.					1																		1				2
Sus sp.		1	4	1	28		3				1	3	5	10	8			1			2				3	6	76
C. elaphus	20			1	9		1	1	2	4	3	4	6	8	1	2	3					2		1	3	3	74
C. capreolus					5							1	1		1										1	1	10
A. alces					1																						1
Ovis s. Capra					5				1				3	1						1						1	12
O. aries													1					1									2
B. taurus					1																						1
Bos sp.					1																						1
SKUPAJ TOTAL	20	2	4	6	73	1	4	6	4	5	5	11	25	28	12	4	3	5	0	6	2	5	4	8	17	15	273

naeus, 1758. Clutton-Brock (1999) sicer domneva, da naj bi kunca s Pirenejskega polotoka v osrednjo Evropo prenesli šele Rimljani, na osnovi česar bi lahko njegovo prisotnost v mezolitskih in prazgodovinskih plasteh Viktorjevega spodmola izključili. Skladna s tem je tudi edina dovolj dobro ohranjena spodnja čeljustnica iz režnja 5 (faza IzA), ki morfološko povsem ustreza poljskemu zajcu (sl. 16.1; Kryštufek 1991). Naveden primerek se tudi v dolžini zobnega niza (18 mm) uvršča znotraj variacijske širine za recentno vrsto *L. europaeus* (17-20 mm; Lavocat 1966) ter tako presega vrednosti za recentne *O. cuniculus* (11-16 mm; Lavocat 1966). V mezolitskih plasteh Pečine na Leskovcu s Tržaškega krasa - *Grotta Azzurra* (Cremonesi *et al.* 1984) in Pečine pri Bjarču v dolini Nadiže - *Riparo di Biarzo* (Rowley-Conwy 1996) sta bila sicer najdena dva fragmenta kunčjega skeleta, vendar pa ob sicer vsesplošni odsotnosti omenjene vrste v mezolitskih in prazgodovinskih plasteh severovzhodne Italije (Bon *et al.* 1991) ne moremo izključiti možnosti, da gre v primeru obeh zgoraj omenjenih mezolitskih kunčjih najdb dejansko za kontaminacijo.

ments of rabbit skeleton were found. Nevertheless, in view of the complete absence of this species in Mesolithic and Prehistoric layers of northeast Italy (Bon *et al.* 1991) the possibility that both the aforementioned Mesolithic rabbit records are actually a contamination cannot be excluded.

Order: Carnivores (Carnivora)
Family: Bears (Ursidae)

Ursus arctos Linnaeus, 1758

Material:

- Viktor phase, layer without pottery: humerus (1 fr.); mixed: phalanx II (1 fr.), phalanx III (1 fr.)
- Viktor and IzA phase: os sesamoideum (4), phalanx III (1 fr.)
- IzA phase: os metacarpus

Finds of brown bear represent only 1.5 percent of all identified specimens in the entire sample from Viktorjev spodmol. Other contemporary sites on the Kras (e.g.,

Red: Zveri (Carnivora)
Družina: Medvedi (Ursidae)

Ursus arctos Linnaeus, 1758

Gradivo:

- Faza Viktor, plast brez keramike: humerus (1 fr.); premešano: phalanx II (1 fr.), phalanx III (1 fr.)
- Faza Viktor in IzA: os sesamoideum (4), phalanx III (1 fr.)
- Faza IzA: os metacarpus

Najdbe rjavega medveda predstavljajo v celotnem vzorcu iz Viktorjevega spodmola le poldrugi odstotek vseh določljivih primerkov. Podobno sliko kažejo tudi druga sočasna najdišča s Krasa (npr. Cremonesi *et al.* 1984; Meluzzi *et al.* 1984; Pohar 1990, Turk *et al.* 1993) in Istre (Miracle *et al.* 2000; 2002). V vseh navedenih primerih namreč delež rjavega medveda nikoli ne presega petih odstotkov, večkrat pa v izkopanem materialu sploh ni bil zastopan. Takratne skupnosti se očitno za lov na medveda praviloma niso odločale, redki uplenjeni primerki pa bi bili lahko tudi rezultat obrambnega dejanja (Bartosiewicz 1999).

Družina: Psi (Canidae)

Canis familiaris Linnaeus, 1758

Gradivo:

- Faza Viktor, plast brez keramike: epistropheus (1 fr.)
- Faza IzA: 7 fragmentov (razpredelnica 16.2)

Pes predstavlja edino domačo žival v mezolitskih režnjih Viktorjevega spodmola, a so njegovi ostanki redki v celotenem profilu. Še ne v celoti osificiran *epistropheus* iz plasti brez keramike (faza Viktor) je pripadal mlajši živali. Podobno lahko rečemo za *phalanx* II iz režnja 8 (faza IzA), ki smo ga zaradi nezraščene proksimalne epifize z diafizo pripisali šele nekajmesečnemu psu (Silver 1972).

Vulpes vulpes (Linnaeus, 1758)

Gradivo:

- Faza Viktor, plast s keramiko: dens (4); premešano: dens (2), cranium (1 fr.)
- Faza Viktor in IzA: dens (2), mandibula (1 fr.), ulna (1 fr.), metacarpus (2), astragalus, calcaneus, metatarsus
- Faza IzA: 5 fragmentov (razpredelnica 16.2)

Ostanki lisice predstavljajo 3,8-odstotni delež vseh določljivih primerkov. Porazdelitev najdb vzdolž profila

Cremonesi *et al.* 1984; Meluzzi *et al.* 1984; Pohar 1990, Turk *et al.* 1993) and Istria (Miracle *et al.* 2000; 2002) show a similar picture. In none of the aforementioned cases does the share of brown bear exceed five percent, and is often entirely absent from the excavated material. Communities of that time clearly did not often choose to hunt bear, and the occasional specimen taken may also have been the result of defensive activity (Bartosiewicz 1999).

Family: Dogs (Canidae)

Canis familiaris Linnaeus, 1758

Material:

- Viktor phase, layer without pottery: epistropheus (1 fr.)
- IzA phase: 7 fragments (Table 16.2)

Dog is the only domestic animal in the Mesolithic spits of Viktorjev spodmol, and its remains are rare in the entire profile. A not entirely ossified *epistropheus* from the layer without pottery (Viktor phase) belonged to a younger animal. The same could be said of the *phalanx* II from spit 8 (IzA phase), which because of the unfused proximal epiphysis we ascribed to a dog only a few months old (Silver 1972).

Vulpes vulpes (Linnaeus, 1758)

Material:

- Viktor phase, layer with pottery: dens (4); mixed: dens (2), cranium (1 fr.)
- Viktor and IzA phase: dens (2), mandibula (1 fr.), ulna (1 fr.), metacarpus (2), astragalus, calcaneus, metatarsus
- IzA phase: 5 fragments (Table 16.2)

Remains of fox represent 3.8 percent of all identified specimens. The distribution of the finds along the profile (IzA phase) indicates their concentration in Prehistoric spits. A similar pattern of distribution was also found with remains of hare. It is worth mentioning that fox may well have contributed to the accumulation of the latter, since it was probably its most important predator (Kryštufek 1991).

Družina: Marten (Mustelidae)

Mustela putorius Linnaeus, 1758

Material:

- IzA phase: os carpale

(faza IzA) kaže na njihovo koncentracijo v prazgodovinskih režnjih. Podoben vzorec je bil ugotovljen tudi pri ostankih poljskega zajca. Pri tem kaže omeniti, da je k akumulaciji slednjih lahko pomembno prispevala prav lisica, saj je bila ta verjetno njegov najpomembnejši plenilec (Kryštufek 1991).

Družina: Kune (Mustelidae)

Mustela putorius Linnaeus, 1758

Gradivo:
- Faza IzA: os carpale

Karpalna kost iz režnja 4 je edini najdeni ostanek navadnega dihurja. Njegov najpomembnejši plenilec je pes (Kryštufek 1991), tako da tudi v tem primeru njegova prisotnost v Viktorjevem spodmolu ni nujno neposredno povezana s človekom.

Martes ex. gr. *martes/foina*

Gradivo:
- Faza Viktor, plast s keramiko: radius (1 fr.), metapodium (2 fr.)
- Faza Viktor in IzA: dens (3)
- Faza IzA: 6 fragmentov (razpredelnica 16.2)

Ostanki kune zlatice *Martes martes* (Linnaeus, 1758) in kune belice *M. foina* (Erxleben, 1777) predstavljajo skupaj dva odstotka vseh najdb iz Viktorjevega spodmola (razpredelnica 16.1). Ločevanje med navedenima vrstama na osnovi fragmentiranih postkranialnih skeletnih elementov je težavno, zato smo se v našem primeru omejili na determinacijo le do nivoju rodu. Danes najdemo na Krasu samo kuno belico, ki je glede izbire habitata veliko manj izbirčna kot pretežno na gozdove vezana kuna zlatica (Kryštufek 1991).

Meles meles (Linnaeus, 1758)

Gradivo:
- Faza Viktor, plast s keramiko: mandibula (1 fr.), humerus; plast brez keramike: mandibula (1 fr.); premešano: os maxillare (1 fr.), atlas (1 fr.), phalanx II, astragalus (1 fr.), ulna (1 fr.), metacarpus (1 fr.), metapodium (1 fr.)
- Faza Viktor in IzA: dens (3), phalanx II (2)
- Faza IzA: 15 fragmentov (razpredelnica 16.2)

Jazbec je s 5,1-odstotnim deležem najbolje zastopana zverska vrsta v Viktorjevem spodmolu. Ob človeku so k akumulaciji njegovih ostankov lahko prispevali tudi volk

The os carpale from spit 4 is the only find of the remains of European polecat. Dog is its most important predator (Kryštufek 1991), so its presence in Viktorjev spodmol is not necessarily connected with mankind.

Martes ex. gr. *martes/foina*

Material:
- Viktor phase, layer with pottery: radius (1 fr.), metapodium (2 fr.)
- Viktor and IzA phase: dens (3)
- IzA phase: 6 fragments (Table 16.2)

Remains of pine marten *Martes martes* (Linnaeus, 1758) and beech marten *M. foina* (Erxleben, 1777) together represent two percent of all finds from Viktorjev spodmol (Table 16.1). Distinguishing between these two species on the basis of fragmented postcranial skeletal elements is difficult, so we limited ourselves here to determination to the level of genus. Only beech marten is found today on the Kras, being a great deal less particular in terms of choice of habitat than the predominantly forest bound pine marten (Kryštufek 1991).

Meles meles (Linnaeus, 1758)

Material:
- Viktor phase, layer with pottery: mandibula (1 fr.), humerus; layer without pottery: mandibula (1 fr.); mixed: os maxillare (1 fr.), atlas (1 fr.), phalanx II, astragalus (1 fr.), ulna (1 fr.), metacarpus (1 fr.), metapodium (1 fr.)
- Viktor and IzA phase: dens (3), phalanx II (2)
- IzA phase: 15 fragments (Table 16.2)

Badger, with a share of 5.1 percent, is the most represented carnivore species in Viktorjev spodmol. Wolf and lynx in addition to man may have contributed to the accumulation of its remains. Nor can the possibility of deaths in the lair be ignored (Kryštufek 1991). We found no trace of human activity (cuts, chop marks) or carnivore's gnawing on any of the finds. In the dimensions from Table 3, the mandible and humerus from Viktorjev spodmol lie at the lower boundary of the range seen in *M. meles* from the Swiss Neolithic site of Seeberg Burgäschisse-Süd (Boessneck *et al.* 1963).

Lutra lutra (Linnaeus, 1758)

Material:
- Viktor phase, layer without pottery: femur (1 fr.)
- IzA phase: tooth

in ris. Zanemariti ne gre niti možnost pogina v jazbinah (Kryštufek 1991). Na nobeni od najdb nismo našli sledov človekovega delovanja (vrez, zasekanina) oz. zverskih zob. V dimenzijah iz tabele 3 se spodnji čeljustnici in humerus iz Viktorjevega spodmola uvrščajo na spodnjo mejo variacijske širine za vrsto *M. meles* iz švicarskega neolitskega najdišča Seeberg Burgäschisse-Süd (Boessneck *et al.* 1963).

Lutra lutra (Linnaeus, 1758)

Gradivo:
- Faza Viktor, plast brez keramike: femur (1 fr.)
- Faza IzA: dens

Femur vidre iz mezolitske plasti Viktorjevega spodmola je bil že popolnoma osificiran in je tako pripadal domnevno več kot tri leta stari živali (Zeiler 1988). Čeprav nismo našli sledi vrezov, pričakujemo, da so jih lovili predvsem zaradi kožuha, medtem ko naj bi imelo meso šele drugoten pomen (Zeiler 1987).

Družina: Mačke (Felidae)

Felis cf. *silvestris* Schreber, 1777

Gradivo:
- Faza Viktor, plast s keramiko: femur (1 fr.); plast brez keramike: humerus (1 fr.); premešano: dens (2), mandibula (1 fr.), phalanx III

The femur of Otter from the Mesolithic layer of Viktorjev spodmol was completely ossified and thus presumably belonged to an animal more than three years old (Zeiler 1988). Although we did not find traces of cuts, we assume that they were hunted mainly for the pelt and the meat was of secondary importance (Zeiler 1987).

Family: Cats (Felidae)

Felis cf. *silvestris* Schreber, 1777

Material:
- Viktor phase, layer with pottery: femur (1 fr.); layer without pottery: humerus (1 fr.); mixed: dens (2), mandibula (1 fr.), phalanx III
- Viktor and IzA phase: dens, ulna (1 fr.), astragalus, phalanx II, phalanx III
- IzA phase: dens, astragalus

Distinguishing between wild and domestic cat *Felis catus* Linnaeus, 1758, is fairly difficult on the basis of postcranial skeletal elements. The identification of cat remains from Viktorjev spodmol as *F. silvestris* is thus based mainly on the fact that the oldest completely domesticated forms of this species in Europe are only known from the second half of the first millennium BC (Bökönyi 1974; Clutton-Brock 1999). The dimensions of the distal part of the humerus from the Mesolithic layer (Viktor phase), which clearly exceed the values for the species *F. catus* are also in agreement with this.

Razpredelnica 16.3: Dimenzije ostankov jazbeca *Meles meles* iz Viktorjevega spodmola (faza IzA). Z izjemo Vzm2 (=višina spodnje čeljustnice za m2) so dimenzije povzete po Von Drieschevi (1976). Podatki za jazbeca iz najdišča Burgäschisee-Süd so povzeti po Jéquierju (1963). Za identifikacijo okrajšav glej prilogo.
Table 16.3: Dimensions of remains of badger *Meles meles* from Viktorjev spodmol (IzA phase). With the exception of Vzm2 (=height of the mandible behind m2) dimensions are taken from Von Driesch (1976). Data for badger from the site Burgäschisee-Süd are taken from Jéquier (1963). See annex for identification of abbreviations.

Skeletni element Skeletal element	Dimenzija Dimension	Vrednost (mm) Measure (mm)	Burgäschisee-Süd (mm)
mandibula	Vzm2	17	17,7–20,7
	m1L	14,5–16 (n=2)	15,4–17,7
	m1B	7 (n=2)	6,8–8,5
atlas	BFcd	32,5	--
	BFcr	24	--
	H	22	--
	Lad	7,5	--
humerus	BT	20,5–21 (n=2)	--
	Bp	23,5	25,7–29,6
	Bd	31	28–32,7
	GL	98,5	98,0–113,4
	Dp	28	8,7–10,1
phalanx I	Bp	7	
	Bd	5	
	GL	13,5	

- Faza Viktor in IzA: dens, ulna (1 fr.), astragalus, phalanx II, phalanx III
- Faza IzA: dens, astragalus

Ločevanje med divjo in domačo mačko *Felis catus* Linnaeus, 1758, je na osnovi postkranialnega skeleta dokaj težavno. Določitev mačjih ostankov iz Viktorjevega spodmola za *F. silvestris* je tako temeljila predvsem na dejstvu, da so najstarejše povsem udomačene oblike omenjene vrste v Evropi znane šele iz druge polovice prvega tisočletja pred Kristusom (Bökönyi 1974; Clutton-Brock 1999). Skladne s tem so tudi dimenzije distalnega dela humerusa iz mezolitske plasti (faza Viktor), ki očitno presegajo vrednosti za vrsto *F. catus*.

Lynx lynx (Linnaeus, 1758)

Gradivo:

- Faza Viktor, premešano: phalanx II (1 fr.)

Druga prstnica, pridobljena med uvodno fazo sondiranja v Viktorjevem spodmolu (tj. faza Viktor), je edina najdba risa s tega najdišča. O sicer vedno maloštevilnih ostankih te vrste poročajo tudi iz nekaterih drugih sočasnih najdišč s tega območja, npr. Pod Črmuklje pri Šembijah (Pohar 1986) in Želvine jame pri Briščikih na Tržaškem krasu - *Grotta della tartaruga* (Cremonesi 1984). Skromnost najdb žal ne dopušča ocene velikosti takratnih živali, kljub temu pa lahko domnevamo, da te niso dosegale danes živečih risov v Sloveniji. Slednji so namreč potomci šestih osebkov po velikosti izstopajoče karpatske podvrste *L. l. carpathicus* Kratochvil in Šollmann, 1963, ki so jih v Kočevskem Rogu naselili leta 1973 (Kryštufek 1991). Avtohtoni ris je bil namreč pred tem v Sloveniji iztrebljen.

Red: Sodoprsti kopitarji ali parkljarji (Artiodactyla)
Družina: Prašiči ali svinje (Suidae)

Sus ex. gr. *scrofa/domesticus*

Gradivo:

- Faza Viktor, plast s keramiko: cranium (2 fr.), dens (2), mandibula (2 fr.), radius (1 fr.), metacarpus, metapodium (2 fr.), phalanx I, ; plast brez keramike: cranium (1 fr.), os maxillare (3 fr.), dens (4), radius (1 fr.), metacarpus (2), ossa coxae (1 fr.), fibula (1 fr.), astragalus, metapodium (2 fr.), phalanx I, ; premešano: os maxillare (2 fr.), dens (14), radius (1 fr.), ulna (1 fr.), ossa carpalia (2), calcaneus, phalanx I (2 fr.), phalanx III (2)
- Faza Viktor in IzA: mandibula (1 fr.), dens (6), os carpale, metacarpus, os sesamoideum (3), metapodium (1 fr.), phalanx I, Phalanx III (1 fr.)

Lynx lynx (Linnaeus, 1758)

Material:

- Viktor phase, mixed: phalanx II (1 fr.)

The second phalanx obtained during the introductory phase of test excavation at Viktorjev spodmol (Viktor phase), is the only find of lynx from this site. Remains of this species are also reported from some other contemporary sites in this region, e.g., Pod Črmukljo by Šembije (Pohar 1986) and Želvina jama by Briščiki (*Grotta della tartaruga*; Cremonesi 1984) on the Triestine Karst, though they are never numerous. The modesty of the finds unfortunately does not allow an assessment of the size of animals, but it can nevertheless be assumed that they did not achieve the size of animals living today in Slovenia. The latter, namely, are the descendants of six individuals of the large Carpathian sub-species *L. l. carpathicus* Kratochvil and Šollmann, 1963, which were introduced into Kočevski Rog in 1973 (Kryštufek 1991), autochthonous lynx having been previously exterminated in Slovenia.

Order: Even-toed ungulates (Artiodactyla)
Family: Pigs (Suidae)

Sus ex. gr. *scrofa/domesticus*

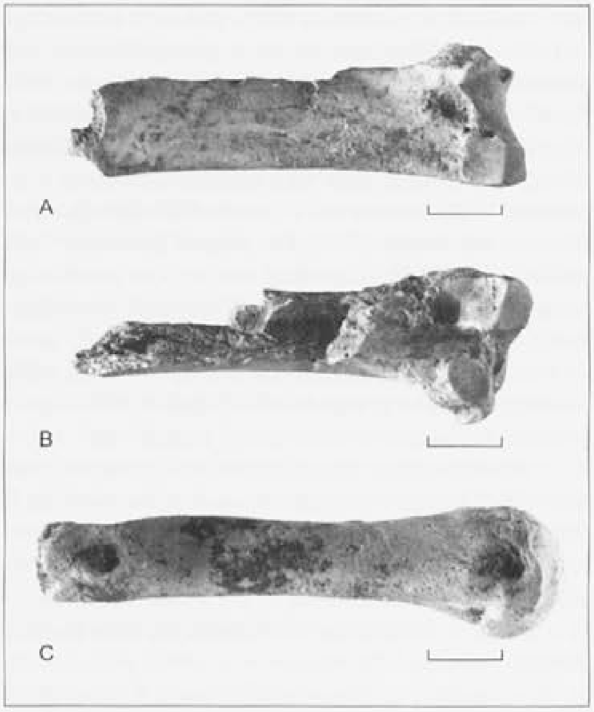
Material:

- Viktor phase, layer with pottery: cranium (2 fr.), dens (2), mandibula (2 fr.), radius (1 fr.), metacarpus, metapodium (2 fr.), phalanx I, ; layer without pottery: cranium (1 fr.), os maxillare (3 fr.), dens (4), radius (1 fr.), metacarpus (2), ossa coxae (1 fr.), fibula (1 fr.), astragalus, metapodium (2 fr.), phalanx I, ; mixed: os maxillare (2 fr.), dens (14), radius (1 fr.), ulna (1 fr.), ossa carpalia (2), calcaneus, phalanx I (2 fr.), phalanx III (2)
- Viktor and IzA phase: mandibula (1 fr.), dens (6), os carpale, metacarpus, os sesamoideum (3), metapodium (1 fr.), phalanx I, phalanx III (1 fr.)
- IzA phase: 76 remains (Table 16.2)

Remains of the genus *Sus* represent approximately one quarter of all finds from Viktorjev spodmol (Table 16.1). Distinguishing between wild boar (*Sus scrofa* Linnaeus, 1758) and domestic pig (*S. domesticus* Erxleben, 1777) only on the basis of bone remains is very difficult (Herre 1972). Differences between the two species in the morphology of skeletal elements are small and limited to elements that are either rare (e.g. canine teeth) or very fragmented (skulls; Bökönyi 1974). In the case of Viktorjev spodmol, we could confirm with certainty the presence of remains of both species in this way (Fig. 16.2), but could not assess the numerical relation bet-

- Faza IzA: 76 ostankov (razpredelnica 16.2)

Ostanki rodu *Sus* predstavljajo približno četrtino vseh najdb iz Viktorjevega spodmola (razpredelnica 16.1). Ločevanje med divjim (*Sus scrofa* Linnaeus, 1758) in domačim (*S. domesticus* Erxleben, 1777) prašičem je le na podlagi kostnih ostankov zelo težavno (Herre 1972). Razlike med obema vrstama v morfologiji skeleta so namreč majhne in omejene na elemente, ki so v arheoloških vzorcih največkrat bodisi redki (npr. podočniki) bodisi zelo fragmentirani (lobanja; Bökönyi 1974). V primeru Viktorjevega spodmola smo sicer na ta način lahko z gotovostjo potrdili prisotnost ostankov obeh vrst (sl. 16.2), ne pa tudi ocenili številčnega razmerja med njima. Za kaj takega so se izkazali kot neprimerni tudi izsledki biometrijske analize izkopanega materiala ter ocena starostne strukture v vzorcu zastopanih osebkov (razpredelnica 16.4; Albarella in Serjeantson 2002). *Metacarpus* III in IV ter *astragalus* iz faze Viktor (plast brez keramike) po dimenzijah lahko v Sloveniji z veliko verjetnostjo pripišemo divjemu prašiču (glej Bökönyi 1995), kar bi lahko rekli tudi o *metacarpus* II iz faze Viktor (plast s keramiko). Gledano v celoti pa je vzorec veliko premajhen, da bi dopuščal oceno obsega prekrivanja med populacijama obeh vrst (Payne in Bull 1988; Bökönyi 1995). Zaradi navedenega naših pričakovanj, da je domači prašič v Viktorjevem spodmolu zastopan le v prazgodovinskih režnjih, tako še ne moremo z gotovostjo potrditi.



Sl. 16.2: Ostanki divjega prašiča *Sus scrofa* iz Viktorjevega spodmola. Legenda: A - metacarpus III (medialno; faza Viktor: plast brez keramike), B - metacarpus IV (medialno; faza Viktor: plast brez keramike), ter C - metacarpus II (lateralno; faza Viktor: plast s keramiko). Merila so podana v cm. Foto M. Grm.

Fig. 16.2: Remains of wild boar *Sus scrofa* from Viktorjev spodmol. Legenda: A - metacarpus III (medial aspect; Viktor phase: layer without pottery), B - metacarpus IV (medial aspect; Viktor phase: layer without pottery), and C - metacarpus II (lateral aspect; Viktor phase: layer with pottery). Measurements are given in cm. Photo M. Grm.

Družina: Jeleni (Cervidae)

Cervus elaphus Linnaeus, 1758

Gradivo:

- Faza Viktor, plast s keramiko: os cornu (4 fr.), dens, mandibula (2 fr.), humerus (2 fr.), ossa metacarpalia (4 fr.), ossa metatarsalia (4 fr.), metapodium (3 fr.), phalanx I (1 fr.); plast brez keramike: os cornu (1 fr.), os maxillare (1 fr.), mandibula (4 fr.), dens, scapula (1 fr.), humerus (2 fr.), ulna (1 fr.), ossa metacarpalia (9 fr.), ossa carpalia (1 fr.), ossa coxae (2 fr.), ossa metatarsalia (3 fr.), metapodium (5 fr.), ossa tarsalia (1), phalanx I (5 fr.), phalanx III (2); premešano: os cornu (2 fr.), dens (3), radius (1 fr.), ossa carpalia (2), ossa metacarpalia (2 fr.), astragalus (3), calcaneus, phalanx I (2 fr.), phalanx II (2 fr.), ossa coxae (1 fr.), ossa metatarsalia (1 fr.), metapodium (1 fr.), ossa sesamoidea (2)
- Faza Viktor in IzA: os cornu (1 fr.), dens, epistropheus, ossa tarsalia (1 fr.), phalanx I (6 fr.)
- Faza IzA: 74 ostankov (razpredelnica 16.2)

Ostanki navadnega jelena predstavljajo največji, skoraj 30-odstotni delež vseh izkopanih kosti in zob v celot-

ween them. The results of biometric analysis of the excavated material and assessment of the age structure in the sample of individuals represented (Table 16.4; Albarella and Serjeantson 2002) also appeared unsuitable. The *metacarpus* III and IV and *astragalus* from the Viktor phase (layer without pottery) in terms of dimensions in Slovenia can be ascribed with great probability to wild boar (*cf.* Bökönyi 1995), which could also be said of the *metacarpus* II from the Viktor phase (layer with pottery). Nevertheless, viewed as a whole, the sample is a great deal too small to allow an assessment of the ratio between the two species (Payne and Bull 1988; Bökönyi 1995). Because of the aforementioned, we cannot with certainty confirm our expectations that domestic pig is represented in Viktorjev spodmol only in the Prehistoric spits.

VIKTORJEV SPODMOL

nem vzorcu (razpredelnica 16.1). Podobno sliko kažejo tudi številna druga mezolitska in prazgodovinska najdišča na Krasu (npr. Riedel 1975; Cremonesi *et al.* 1984; Pohar 1990; Turk *et al.* 1993; Petrucci 1997; Boschin in Riedel 2000) in v Istri (Miracle *et al.* 2000; Miracle 2002), kjer je jelen prav tako najbolje zastopana vrsta (lovnih) velikih sesalcev. V okviru Viktorjevega spodmola so bili ostanki *C. elaphus* pogosti predvsem v mezolitski plasti (faza IzA: režnji 10–19), kjer predstavljajo skoraj polovico vseh najdb. Po drugi strani so v prazgodovinskih režnjih (faza IzA: režnji 1–7) s komaj 10-odstotnim deležem veliko manj številni. Ugotovitev je pričakovana, saj se je v prazgodovini s pojavom živinoreje in poljedelstva pomen lova postopno zmanjševal.

Delež kosti s še nezraščenima epi- in diafizo je zanemarljiv (1,5 %). Merljivih ostankov je premalo, da bi lahko ocenili velikost preteklih populacij; jelen je namreč zelo variabilna vrsta (Kryštufek 1991). Primerjava dimenzij izkopanih primerkov iz Viktorjevega spodmola s tistimi iz švicarskega neolitskega najdišča Seeberg Burgäschisse-Süd (Boessneck *et al.* 1963) pa je pokazala, da so slednji praviloma nekoliko večji. Kolikor je naš vzorec reprezentativen, potem bi lahko sklepali, da mezolitski jeleni po velikosti niso presegali poznejših, prazgodovinskih živali iste vrste. Do podobnih zaključkov je za območje Tržaškega krasa prišel tudi Riedel (1975).

Alces alces (Linnaeus, 1758)

Gradivo:

- Faza IzA: dens

Levi četrti spodnji predmeljak (dolžina: 28 mm; širina 19,5 mm) je edini ostanek losa v vzorcu iz Viktorjevega

Family: Deer (Cervidae)

Cervus elaphus Linnaeus, 1758

Material:

- Viktor phase, layer with pottery: os cornu (4 fr.), dens, mandibula (2 fr.), humerus (2 fr.), ossa metacarpalia (4 fr.), ossa metatarsalia (4 fr.), metapodium (3 fr.), phalanx I (1 fr.); layer without pottery: os cornu (1 fr.), os maxillare (1 fr.), mandibula (4 fr.), dens, scapula (1 fr.), humerus (2 fr.), ulna (1 fr.), ossa metacarpalia (9 fr.), ossa carpalia (1 fr.), ossa coxae (2 fr.), ossa metatarsalia (3 fr.), metapodium (5 fr.), ossa tarsalia (1), phalanx I (5 fr.), phalanx III (2); mixed: os cornu (2 fr.), dens (3), radius (1 fr.), ossa carpalia (2), ossa metacarpalia (2 fr.), astragalus (3), calcaneus, phalanx I (2 fr.), phalanx II (2 fr.), ossa coxae (1 fr.), ossa metatarsalia (1 fr.), metapodium (1 fr.), ossa sesamoidea (2)
- Viktor and IzA phase: os cornu (1 fr.), dens, epistropheus, ossa tarsalia (1 fr.), phalanx I (6 fr.)
- IzA phase: 74 remains (Table 16.2)

Remains of red deer represent the largest, almost 30% share of all excavated bones and teeth in the whole sample (Table 16.1). Numerous other Mesolithic and Prehistoric sites on the Kras (e.g., Riedel 1975; Cremonesi *et al.* 1984; Pohar 1990; Turk *et al.* 1993; Petrucci 1997; Boschin and Riedel 2000) and in Istria (Miracle *et al.* 2000; Miracle 2002) show a similar picture, where red deer is similarly the most represented species of (hunted) large mammal. In the context of Viktorjev spodmol, the remains of *C. elaphus* are frequent above all in the Mesolithic layer (IzA phase: spits 10–19), where they represent almost half of all finds. On the other hand in

Razpredelnica 16.4: Število prašičjih (*Sus* sp.) kosti z (ne)zraščenima epi- in diafizo po starostnih skupinah. Posamezno skupino sestavljajo skeletni elementi, ki popolnoma osificirajo v istem starostnem obdobju. Podatki o obdobju zraščanja epi- in diafiz so povzeti po Silverju (1972).

Table 16.4: Number of domestic pig/wild boar (*Sus* sp.) bones with (un)fused epiphyses by age groups. Individual groups consist of skeletal elements that are completely ossified in the same age period. Data on the period of fusing of epiphyses is taken from Silver (1972).

Doba Period	**Starost (v letih) Age (in years)**	**Epifiza zraščena Epiphysis fused**	**Epifiza ni zraščena Epiphysis not fused**	**SKUPAJ TOTAL**
PRAZGODOVINA PREHISTORY	0–1	2	--	5
	1–2	1	2	3
	2–3	1	4	5
	3–	--	--	--
	SKUPAJ / TOTAL	4	6	10
MEZOLITIK MESOLITHIC	0–1	6	--	6
	1–2	6	5	11
	2–3	5	6	11
	3–	1	1	2
	SKUPAJ / TOTAL	18	12	30

spodmola (sl. 16.3). Obraba grizalne površine kaže, da je zob pripadal odrasli živali. O izoliranih najdbah losa na Krasu poročajo tudi z mezolitskih najdišč Mala Triglavca pri Divači (Pohar 1990) in Jama na Sedlu pri Šempolaju na Tržaškem krasu - *Grotta Benussi* (Riedel 1975).

Capreolus capreolus (Linnaeus, 1758)

Gradivo:

- Faza Viktor, plast s keramiko: atlas (1 fr.), ossa metatarsalia (1 fr.); plast brez keramike: scapula (1 fr.), ossa coxae (2 fr.); premešano: dens, ossa tarsalia (1), phalanx I (2 fr.)
- Faza Viktor in IzA: metapodium (1 fr.), phalanx I (1 fr.), phalanx III (1 fr.)
- Faza IzA: 10 ostankov (razpredelnica 16.2)

Skupno 21 ostankov srne predstavlja slabe štiri odstotke vseh izkopanih kosti in zob. Pretežni del najdb izhaja iz mezolitskih režnjev, podobno kot to velja tudi za preostali dve pomembni lovni vrsti (jelena, divjega prašiča). Z izjemo metapodija iz faze Viktor in IzA, so bili vsi drugi izkopani fragmenti že popolnoma osificirani.

Družina: Votlorogi (Bovidae)

Ovis s. *Capra*

Gradivo (* - *C. hircus*, ** - *O. aries*):

- Faza Viktor, plast s keramiko: ossa tarsalia (1), humerus (1 fr.**), ossa metacarpalia (1 fr.**), femur (1 fr.**), tibia (1 fr.**); premešano: dens (4), dens (1*)

Sl. 16.3: Levi četrti spodnji predmeljak losa *Alces alces* iz Viktorjevega spodmola (faza IzA: reženj 6). Merilo je podano v cm. Foto M. Grm.

Fig. 16.3: Left fourth lower molar of moose Alces alces from Viktorjev spodmol (IzA phase: spit 6). Measurements are given in cm. Photo M. Grm.

Prehistoric spits (IzA phase: spits 1-7) they are very much less numerous, with a ten percent share. The finding is expected, since in the Prehistoric period the importance of hunting was gradually reduced with the appearance of animal husbandry and arable farming.

The share of bones with unfused epiphyses is negligible (1.5 %). There are too few measurable remains to be able to assess the size of former populations; red deer, namely is a very variable species (Kryštufek 1991). Comparison of the dimensions of the excavated specimens from Viktorjev spodmol with those from the Swiss Neolithic site Seeberg Burgäschisse-Süd (Boessneck *et al.* 1963) indicate that the latter were generally somewhat larger. Insofar as our sample is representative, then we could conclude that Mesolithic deer were not larger than Prehistoric animals of this species. Riedel (1975) came to a similar conclusion for the area of the Triestine Karst.

Alces alces (Linnaeus, 1758)

Material:

- IzA phase: dens

The left fourth lower premolar (length: 28 mm; width 19.5 mm) is the only remains of moose in the sample from Viktorjev spodmol (Fig. 16.3). The worn gnawing surface indicates that the tooth belonged to an adult animal. Isolated finds of moose on the Kras are also reported from Mesolithic sites Mala Triglavca by Divača (Pohar 1990) and Jama na Sedlu by Šempolaj (*Grotta Benussi*; Riedel 1975) on the Triestine Karst.

Capreolus capreolus (Linnaeus, 1758)

Material:

- Viktor phase, layer with pottery: atlas (1 fr.), ossa metatarsalia (1 fr.); layer without pottery: scapula (1 fr.), ossa coxae (2 fr.); mixed: dens, ossa tarsalia (1), phalanx I (2 fr.)
- Viktor and IzA phase: metapodium (1 fr.), phalanx I (1 fr.), phalanx III (1 fr.)
- IzA phase: 10 remains (Table 16.2)

A total of 21 remains of roe deer represent less than four percent of all excavated bones and teeth. The predominant part of finds derive from Mesolithic spits, as also applies for the other two important hunted species (red deer, wild boar). With the exception of the metapodium from the Viktor and IzA phase, all other excavated fragments were completely ossified.

- Faza Viktor in IzA: dens (5), phalanx I (1 fr.)
- Faza IzA: 14 ostankov (razpredelnica 16.2)

Od skupno 31 ostankov, ki smo jih pripisali drobnici, jih je bilo mogoče le osem določiti do nivoja vrste. Tako je bila ovca (*Ovis aries* Linnaeus, 1758) zastopana s šestimi, koza (*Capra hircus* Linnaeus, 1758) pa z dvema najdbama. Skromno število ostankov sicer onemogoča oceno vloge ene in druge vrste v takratni živinoreji. Kaže pa omeniti, da ostanki ovce prevladujejo tudi v drugih prazgodovinskih najdiščih na Krasu (Cremonesi *et al.* 1984; Petrucci 1997; Boschin in Riedel 2000).

V skladu s pričakovanji smo vseh 31 ostankov pobrali bodisi iz prazgodovinskih režnjev bodisi iz sedimenta, kjer so bile najdbe premešane. Na osnovi ocene starostne strukture živali ob zakolu (razpredelnica 16.5) se zdi, da sekundarni produkti reje drobnice niso imeli večjega pomena. Od sicer skupno komaj 15 ustrezno ohranjenih skeletnih elementov jih namreč devet še ni imelo zraščene epi- in diafize. Ker osem od navedenih devetih ostankov pri drobnici popolnoma osificira pri starosti med 12 in 36 mesecev (Moran in O'Connor 1994) lahko upravičeno domnevamo, da so šle te živali v zakol pred dopolnitvijo tretjega leta starosti. Po drugi strani vseh šest fragmentov z že zraščenima epi- in diafizo iz našega vzorca popolnoma osificira preden žival dopolni 24 mesecev starosti, kar zopet dopušča možnost, da so ostanki pripadali živalim, mlajšim od treh let. V kolikor bi bil naš vzorec reprezentativen, bi navedene ugotovitve lahko razumeli kot razmeroma zanesljiv kazalec pretežno v produkcijo mesa usmerjene reje ovc in koz (Jarman 1975; Boschin in Riedel 2000). Edini ustrezno ohranjen spodnji meljak je domnevno pripadal med štiri in osem let stari živali (Payne 1973; 1987)

Bos cf. *primigenius* Bojanus, 1827

Gradivo:
- Faza Viktor, plast brez keramike: dens, phalanx I (2), phalanx III
- Faza IzA: dens

VIKTORJEV SPODMOL

Family: Antelopes, gazelles, cattle, sheep, goats, and relatives (Bovidae)

Ovis s. *Capra*

Material (* - *C. hircus*, ** - *O. aries*):
- Viktor phase, layer with pottery: ossa tarsalia (1), humerus (1 fr.**), ossa metacarpalia (1 fr.**), femur (1 fr.**), tibia (1 fr.**); mixed: dens (4), dens (1*)
- Viktor and IzA phase: dens (5), phalanx I (1 fr.)
- IzA phase: 14 remains (Table 16.2)

Of a total of 31 remains that can be ascribed to ovicaprines, it was only possible to ascribe a species to eight. So sheep (*Ovis aries* Linnaeus, 1758) are represented with six and goat (*Capra hircus* Linnaeus, 1758) with two finds. The modest number of remains do not allow an evaluation of the role of either species in then animal husbandry. It is worth mentioning that the remains of sheep also predominate in other Prehistoric sites on the Kras (Cremonesi *et al.* 1984; Petrucci 1997; Boschin and Riedel 2000).

In line with expectations, we collected all 31 remains either from Prehistoric spits or from sediments where the finds had been mixed. On the basis of an assessment of the age structure of animals at death (Table 16.5) it appears that secondary products of rearing ovicaprines did not have major importance. Of a total of barely 15 suitably preserved skeletal elements, namely, nine did not have fused epiphyses. Since in ovicaprines eight of the nine aforementioned remains completely ossify at an age between 12 and 36 months (Moran in O'Connor 1994) we can justifiably assume that these animals were killed before the age of three years. On the other hand all the skeletal elements represented in this sample with fragments having epiphyses fused with diaphyses (N=6), tend to ossify completely before the animal is 24 month old. The latter again allows the possibility that the remains belonged to animals younger than three years. Insofar as our sample is representative, the aforementioned finding could be understood as a relati-

Razpredelnica 16.5: Število ostankov drobnice (*Ovis* s. *Capra*) z (ne)zraščenima epi- in diafizo po starostnih skupinah. Posamezno skupino sestavljajo skeletni elementi, ki popolnoma osificirajo v istem starostnem obdobju. Podatki o obdobju zraščanja epi- in diafiz so povzeti po Moran in O'Connor (1994).
Table 16.5: Number of remains of ovicaprines (*Ovis* s. *Capra*) with (un)fused epiphyses by age groups. Individual groups consist of skeletal elements that are completely ossified in the same age period. Data on the period of fusing of the epiphyses are taken from Moran and O'Connor (1994).

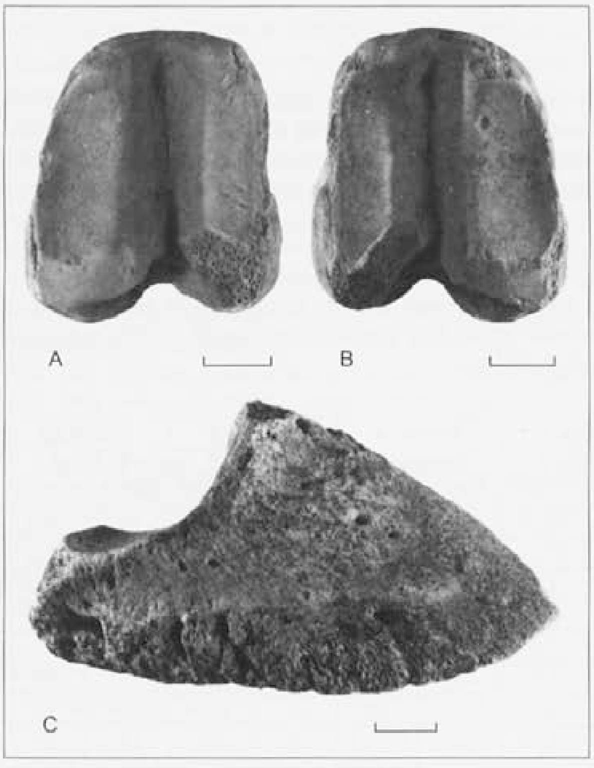
Starost (v letih) Age (in years)	Epifiza zraščena Epiphysis fused	Epifiza ni zraščena Epiphysis not fused	SKUPAJ TOTAL
0–1	--	1	1
1–2	5	5	10
2–3	3	--	3
3–	1	--	1
SKUPAJ / TOTAL	9	6	15

Dva zoba in tri prstnice iz Viktorjevega spodmola po vsej verjetnosti pripadajo pragovedu (sl. 16.4). Do takšnega sklepa smo prišli na osnovi dimenzij navedenih fragmentov (priloga), ki se uvrščajo znotraj variacijske širine za neolitskodobna pragoveda iz Švice in Danske (Payne 1972a). Posamezni ostanki te vrste so znani tudi iz dveh najdišč pri Divači, oddaljenih le nekaj kilometrov od Viktorjevega spodmola, namreč iz Male Triglavce (mezolitik; Pohar 1990) in Trhlovce (prazgodovina; Turk, neobjavljeno) ter tudi iz Istre (Miracle 2000).

Bos taurus Linnaeus, 1758

Gradivo:
- Faza Viktor, plast s keramiko: mandibula (1 fr.), epistropheus (1 fr.), vertebae cervicales (1 fr.), ossa coxae (1 fr.), phalanx I (1 fr.), phalanx II (1 fr.); premešano: dens (1 fr.), astragalus, phalanx III
- Faza IzA: dens

Domačemu govedu smo skupno pripisali le 11 (1,9 %)



Sl. 16.4: Phalanx I (proksimalna sklepna površina; A in B) ter phalanx III (lateralno; C) iz Viktorjevega spodmola, ki domnevno pripadata turu *Bos primigenius*. Material je bil pobran med fazo Viktor v plasti brez keramike. Merila so podana v cm. Foto M. Grm.
Fig. 16.4: Phalanx I (proximal aspect; A and B) and phalanx III (lateral aspect; C) from Viktorjev spodmol, presumed to belong to aurochs *Bos primigenius*. Material was collected during the Viktor phase in the layer without pottery. Measurements are given in cm. Foto M. Grm.

vely reliable indicator of the rearing of sheep and goats being oriented to the production of meat (Jarman 1975; Boschin and Riedel 2000). The only adequately preserved lower molar is presumed to have belonged to an animal between four and eight years (Payne 1973; 1987).

Bos cf. *primigenius* Bojanus, 1827

Material:
- Viktor phase, layer without pottery: dens, phalanx I (2), phalanx III
- IzA phase: dens

Two teeth and three phalanges from Viktorjev spodmol in all likelihood belong to aurochs (Fig. 16.4). We came to such a conclusion on the basis of the dimensions of the aforementioned fragments (annex) which lie within the range of Neolithic aurochs from Switzerland and Denmark (Payne 1972a). Individual remains of this species are also known from two sites by Divača, only a few kilometres from Viktorjev spodmol, namely Mala Triglavca (Mesolithic; Pohar 1990) and Trhlovca (Prehistoric; Turk, unpublished) and also from Istria (Miracle 2000).

Bos taurus Linnaeus, 1758

Material:
- Viktor phase, layer with pottery: mandibula (1 fr.), epistropheus (1 fr.), vertebae cervicales (1 fr.), ossa coxae (1 fr.), phalanx I (1 fr.), phalanx II (1 fr.); mixed: dens (1 fr.), astragalus, phalanx III
- IzA phase: dens

Only 11 (1.9 %) finds were ascribed to domesticated cattle. The remains were collected either from Prehistoric spits or from sediments in which finds were mixed. Similar low shares of bones and teeth of this species are also reported from other contemporary sites on the Kras (Riedel 1975; Turk *et al.* 1992; Turk *et al.* 1993; Petrucci 1997; Boschin and Riedel 2000). The finding is also entirely in agreement with the thesis that sheep and goats were the main animals reared in this region from the Neolithic onwards.

16.2 Discussion

The main problems with which we were confronted in an attempt to interpret the excavated remains of large mammals from Viktorjev spodmol, were the modest number of finds and relatively small area on which they were collected. Both, of course, are negatively reflected on the representative nature of the sample, which also najdb. Ostanki so bili pobrani bodisi iz prazgodovinskih režnjev bodisi iz sedimenta, kjer so bile najdbe premešane. O podobno nizkih deležih kosti in zob te vrste poročajo tudi iz drugih sočasnih najdišč na Krasu (Riedel 1975; Turk *et al.* 1992; Turk *et al.* 1993; Petrucci 1997; Boschin in Riedel 2000). Ugotovitev je navsezadnje povsem v skladu s tezo, da sta bili na tem območju od neolitika naprej poglavitni živinorejski panogi ovčereja in kozjereja.

16.2 Razprava

Poglavitna problema, s katerima smo se srečevali pri poskusu interpretacije izkopanih ostankov velikih sesalcev iz Viktorjevega spodmola, sta bila skromno število najdb in relativno majhna površina, s katere so bile te pobrane. Oboje seveda negativno odseva v reprezentativnosti vzorca, kar postavlja pod vprašaj tudi posamezne v tem prispevku ponudene interpretacije. Ujemanje naših ugotovitev z ugotovitvami raziskovalcev z različnih drugih sočasnih najdišč slovenskega in tržaškega krasa sicer poveča njihovo težo, vendar pa pri tem ne

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raises a question about individual interpretations offered in this contribution. The correspondence of our findings with the findings of researchers of various other contemporary sits of the Slovene and Triestine Karst increase their weight, but the difficulties connected with the use of dissimilar techniques and methods of excavation should not be overlooked. Methods of obtaining samples that are not comparable, namely are incompatable.

Much the same could be said of the material itself from Viktorjev spodmol, since it was collected with the use of various techniques and methods of excavation. The fairly diverse data on the numerical status of individual species (Table 16.6 and Fig. 16.5) already draws attention to the trap of unifying samples obtained during various phases of test excavation. So, e.g., the share of red deer remains in the Prehistoric sedimentat of Viktor phase is almost 34% while remains of the same animal in the Prehistoric spits of IzA phase are only 9 percent of all finds. In assessing the relative frequency of individual taxa, we therefore used exclusively data from the IzA phase (Table 16.7). Only the latter, namely, is distinguished by the use of exact techniques and methods of excavation, including wet sieving.

Razpredelnica 16.6: Število določenih primerkov (NISP) v Viktorjevem spodmolu zastopanih taksonov velikih sesalcev, pridobljenih med posamezno fazo izkopavanj. Identifikacija simbolov: vzorec 1 – faza Viktor (plast s keramiko), vzorec 2 – faza Viktor (plast brez keramike), vzorec 3 – faza Viktor in IzA (ponovno pregledan nestratificiran sediment iz faze Viktor), vzorec 4 – faza Viktor in IzA (pobrano s sit s premerom luknjic 10 mm) ter vzorec 5 – faza Viktor in IzA (pobrano s sit s premerom luknjic 3 mm). Za obrazložitev glej besedilo.

Table 16.6: Number of identified specimens (NISP) of individual taxa of large mammals represented in Viktorjev spodmol, obtained during individual phases of excavation. Identification of symbols: sample 1 – Viktor phase (layer with pottery), sample 2 – Viktor phase (layer without pottery), sample 3 – Viktor and IzA phase (re-examination of unstratified sediments from Viktor phase), sample 4 – Viktor and IzA phase (collected on sieves with 10 mm hole diameter) and sample 5 – Viktor and IzA phase (collected on sieves with 3 mm hole diameter). See text for explanation.

Takson Taxon	Vzorec 1 Sample 1		Vzorec 2 Sample 2		Vzorec 3 Sample 3		Vzorec 4 Sample 4		Vzorec 5 Sample 5		SKUPAJ TOTAL	
	NISP	%NISP	NISP	%NISP	NISP	%NISP	NISP	%NISP	NISP	%NISP	NISP	%NISP
C. elaphus	21	33,9	39	57,2	24	26,1	9	28,1	1	1,7	94	30,1
Sus sp.	12	19,3	17	25,2	27	29,3	4	12,5	11	18,6	71	22,7
L. europaeus	7	11,3			8	8,7	5	15,6	25	42,3	45	14,4
V. vulpes	5	8,1			3	3,3	7	21,9	2	3,4	17	5,4
M.meles	2	3,2	1	1,5	7	8,7			5	8,5	15	5,1
C.capreolus	2	3,2	3	4,3	3	3,3	2	6,2	1	1,7	11	3,5
Felis sp.	1	1,6	1	1,5	4	4,3	1	3,3	4	6,8	11	3,5
Ovis s. *Capra*	1	1,6			4	4,3	2	6,2	4	6,8	11	3,5
O. aries	4	6,5									4	1,3
C. hircus	1	1,6			1	1,1					2	0,6
B. taurus	6	9,7			4	4,3					10	3,2
Bos cf. *primigenius*			4	5,8							4	1,3
U. arctos			1	1,5	2	2,2	2	6,2	3	5,1	8	2,6
Martes sp.					3	3,3			3	5,1	6	1,9
C. familiaris			1	1,5							1	0,3
L. lynx					1	1,1					1	0,3
L. lutra			1	1,5							1	0,3
SKUPAJ / TOTAL	62	100	68	100	91	100	32	100	59	100	312	100

gre spregledati težav povezanih z uporabo neenakih tehnik in metod izkopavanj. Na neprimerljiv način pridobljeni vzorci namreč niso združljivi.

Podobno bi lahko trdili tudi o samem materialu iz Viktorjevega spodmola, saj je bil zbran z uporabo različnih tehnik in metod izkopavanj. Na pasti pri združevanju vzorcev, pridobljenih med različnimi fazami sondiranja, opozarjajo že dokaj različni podatki o številčnosti posameznih vrst (razpredelnica 16.6 in sl. 16.5). Tako npr. delež jelenjih ostankov v prazgodovinskem sedimentu faze Viktor dosega skoraj 34 odstotkov, medtem ko predstavljajo ostanki iste živali v prazgodovinskih režnjih faze IzA le devet odstotkov vseh najdb. Pri oceni relativnih frekvenc posameznih taksonov smo v tem prispevku tako uporabili izključno podatke iz faze IzA (razpredelnica 16.7). Le slednjo namreč odlikuje uporaba natančnih tehnik in metod izkopavanj, vključno s spiranjem sedimentov.

Bolj kot pogostnost najdb posameznih taksonov v celotnem vzorcu so izpovedni ločeni podatki za prazgodovinsko in mezolitsko skupino režnjev. V ta namen je bilo najprej treba določiti mejo med obema sklopoma, kar pa ni bilo preprosto. Na osnovi arheoloških najdb je I. Turk (ta zbornik) ugotovil, da bi jo bilo smiselno postaviti nekje znotraj skupine režnjev od šest do deset, pri čemer je slednji že zagotovo "mezolitski". Po drugi strani postavlja slika, ki jo kažejo ostanki malih sesalcev, ločnico med izkopa sedem in osem (Toškan in Kryštufek, ta zbornik). V našem primeru smo se tako odločili, da prištejemo k prazgodovinskim vse tiste najdbe, ki so bile pobrane iz zgornjih sedmih, k mezolitskim pa vse

Separate data for Prehistoric and Mesolithic groups of spits are more informative than the frequency of finds of individual taxa in the whole sample. For this purpose, it was first necessary to determine the boundary between the two complexes, which was not simple. On the basis of the archaeological finds, I. Turk (this volume) established that it could sensibly be put somewhere within the group of spits from six to nine, whereby the latter is already certainly "Mesolithic". On the other hand, the picture shown by the remains of small mammals puts the division between spits seven and eight (Toškan and Kryštufek, this volume). We decided to consider Prehistoric all those finds from spit seven upwards and Mesolithic all those collected from below spit nine. Bones and teeth from the "disputed" spits eight and nine were thus excluded from the analysis.

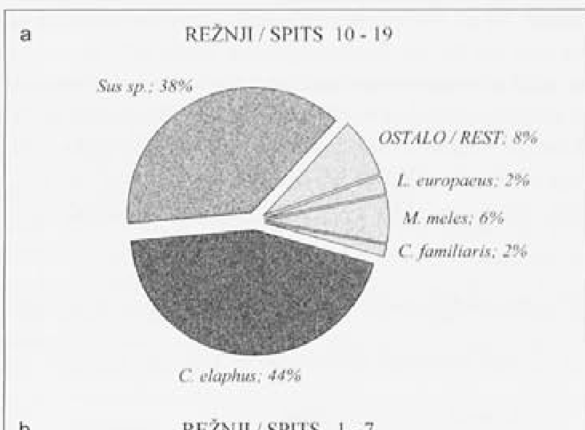
The high share of remains of red deer (44 %) and wild boar (38 %) in spits 10-19 confirms the major importance of hunting for Mesolithic communities of this region (Fig. 16.5a). Many other contemporary sites on the Kras (e.g., Riedel 1975; Cremonesi *et al.* 1984; Pohar 1990; Boschin and Riedel 2000) and in Istria (Miracle *et al.* 2000; Miracle 2002) show a similar expected picture. In all the aforementioned cases, the remains of red deer are far the most numerous, while wild boar and roe deer alternate in second and third place. Of domestic animals, only dog was represented in Mesolithic spits, although it must be remembered that reliably distinguishing between wild and domestic pig was often not possible. However, data on the remains of domestic ani-

Razpredelnica 16.7: Število določenih primerkov (NISP) v Viktorjevem spodmolu zastopanih taksonov velikih sesalcev po režnjih. Podatki se nanašajo izključno na ostanke iz faze IzA.
Table 16.7: Number of identified specimens (NISP) of individual taxa of large mammals represented in Viktorjev spodmol, by spits. Data refers exclusively to remains from phase IzA.

Takson \ Reženj Taxon \ Spit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	SKUPAJ TOTAL
L. europaeus	2	5	13	10	14	6	2	1	2	1	1						1			58
M. meles		1	1	1	1	1		1	1	1		3		1	2			1		15
M. putorius				1																1
Martes sp.	2	1							1					1	1					6
L. lutra									1											1
V. vulpes	1		1	1	1						1									5
C. familiaris				1	1		2	1				2								7
U. arctos												1								1
Felis sp.				1		1														2
Sus sp.	2	3	6	1	4	2		4	4	2	7	1	14	10	11	4	1			76
C. elaphus		1	1	1	5	1		1	6	9	10	9	15	9	5		1			74
C. capreolus	1						1	1	2	1			1	2		1				10
A. alces						1														1
Ovis s. *Capra*	1	2		4	4	1														12
O. aries			1		1															2
B. taurus	1																			1
Bos sp.												1								1
SKUPAJ / TOTAL	10	13	23	21	31	13	5	9	17	14	19	17	30	23	19	5	3	1	0	273

tiste, ki so bile pobrane iz spodnjih desetih režnjev. Kosti in zobe iz "spornih" izkopov osem in devet smo torej izključili iz analize.

Visoka deleža ostankov jelena (44 %) ter divjega prašiča (38 %) v režnjevih 10–19 potrjujeta velik pomen lova za mezolitske skupnosti tega območja (sl. 16.5a). Podobno pričakovano sliko kažejo tudi mnoga druga sočasna najdišča na Krasu (npr. Riedel 1975; Cremonesi *et al.* 1984; Pohar 1990; Boschin in Riedel 2000) in v Istri (Miracle *et al.* 2000; Miracle 2002). V vseh navedenih primerih so namreč daleč najštevilčnejši prav ostanki jelena, medtem ko se na drugem in tretjem mestu izmenjujeta divji prašič in srna. Od domačih živali je bil v mezolitskih režnjih zastopan le pes, čeprav je treba spomniti, da zanesljivo ločevanje med divjim in domačim prašičem pogosto ni bilo mogoče. Sicer pa so podatki o ostankih domačih živali (z izjemo psa) razmeroma maloštevilni tudi v mezolitskih plasteh drugih sočasnih najdišč s Krasa in Istre, pa še ti so praviloma omejeni na obdobje prehoda iz mezolitika v neolitik. To pa seveda dopušča tudi možnost kontaminacije oz. vprašljive časovne umestitve najdb (npr. Riedel 1975).



Sl. 16.5a, b: Relativna frekvenca ostankov (% NISP) posameznih v Viktorjevem spodmolu zastopanih taksonov velikih sesalcev. Podatki se nanašajo izključno na ostanke iz faze IzA: režnji 10–19 (a) in 1–7 (b).

Fig. 16.5a, b: Relative frequency of remains (% NISP) of individual taxa of large mammals represented in Viktorjev spodmol. Data refer exclusively to remains from the IzA phase: spits 10–19 (a) and 1–7 (b).

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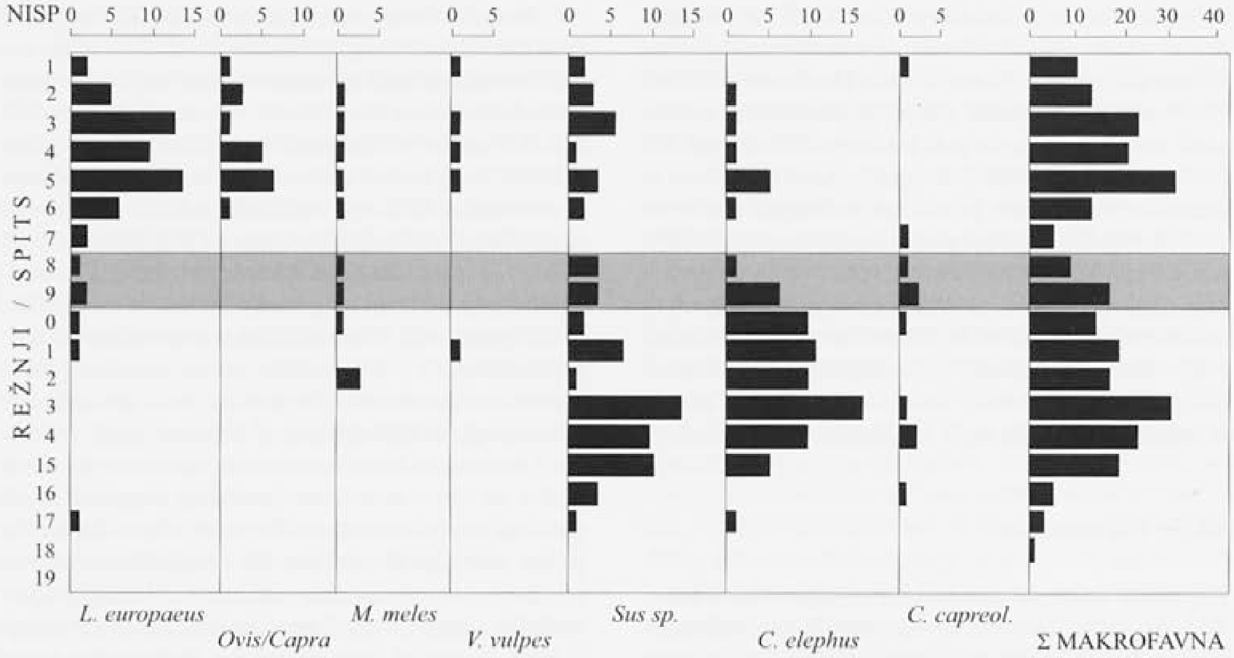
mals (with the exception of dog) are relatively small in number also in Mesolithic layers of other contemporary sites on the Kras and in Istria, and they are generally limited to the period of transition from the Mesolithic to the Neolithic. This also, of course, allows the possibility of contamination or dubious temporal setting of finds (e.g., Riedel 1975).

The picture shown by the remains of large mammals from spits one to seven is essentially different. Above all, the undisputed presence of remains of domestic animals (ovicaprines, cattle) must be mentioned, and the share of the previously predominant red deer is clearly smaller (by 35%). Rather less extensive is the fall in numbers of the remains of the genus *Sus*, which can be ascribed to the fact that a significant share of finds of the abovementioned genus in the Prehistoric sample can certainly be ascribed to domestic pig. Despite the suspicion that hunting was still relatively important long after the end of the Mesolithic (Chapman and Müller 1990), the main differences established between the Castelnovian and Prehistoric samples can certainly be ascribed to the increased importance of livestock rearing and arable farming. Perhaps we can also explain in this light the exceptional increase in the number of excavated remains of hare (Fig. 16.5b). Regardless of whether the main factor of their accumulation in Viktorjev spodmol was man or some carnivore (e.g., fox, wild cat), such a clear jump is very probably an indicator of specific changes in the palaeo-environment: i.e., a spread of open habitats as a result of arable farming and the rearing of ovicaprines. A number of palinological analyses (e.g., Culiberg 1995; Šercelj 1996; Andrič 2002) point in this direction, and Toškan and Kryštufek (this volume) came to a similar conclusion about the palaeoenvironment on the basis of remains of small mammals from Viktorjev spodmol.

The use of percentages for expressing quantitative relations between remains of individual taxa in the sample is a generally used method in zooarchaeology, but it conceals major traps. So, e.g., the appearance of remains of new species inevitably causes a reduction of the share of those already present, although their absolute numbers actually remain unchanged (*cf.* Payne 1972a). Taking such "phantom" changes into account in the shares of individual species, can of course lead to very wrong conclusions. In order that this should not happen in our case, we also compared the Mesolithic and Prehistoric samples from the IzA phase in absolute number of remains of individual taxa (NISP). As is clear from Fig. 16.6, the results entirely confirm the findings already presented: the absence of domestic animals (except dog) from Mesolithic spits and a fall in numbers of finds of hunted game (red deer, wild boar, roe deer) with the arrival the Prehistoric period. There is also a clear leap in the numbers of remains of hare in the upper seven spits.



Sl. 16.6: Število določenih fragmentov (NISP) nekaterih taksonov velikih sesalcev v Viktorjevem spodmolu, po režnjih. Podatki se nanašajo izključno na ostanke iz faze IzA.
Fig. 16.6: Number of individual fragments (NISP) of certain taxa of large mammals in Viktorjev spodmol, by spits. Data refer exclusively to remains from the IzA phase.

Slika, ki jo kažejo ostanki velikih sesalcev iz režnjev ena do sedem je bistveno drugačna. Predvsem moramo omeniti nesporno prisotnost ostankov domačih živali (drobnica, govedo), očitno manjši pa je tudi delež prej vodilnega jelena (za kar 35 %). Nekoliko manj obsežen je upad številčnosti ostankov rodu *Sus*, kar lahko pripišemo dejstvu, da gre v prazgodovinskem vzorcu pomemben delež prašičjih najdb zagotovo pripisati domačemu prašiču. Kljub domnevi, da je bil na Krasu lov razmeroma pomemben še dolgo po koncu mezolitika (Chapman in Müller 1990), lahko pretežni del ugotovljenih razlik med kastelnovjenskim in prazgodovinskim vzorcem pripišemo prav povečanemu pomenu živinoreje in poljedelstva. Morda lahko v tej luči razložimo tudi izjemno povečanje števila izkopanih ostankov zajca (sl. 16.5b). Ne glede na to, ali je bil poglavitni dejavnik njihove akumulacije v Viktorjevem spodmolu človek ali pa kaka zver (npr. lisica, divja mačka), je namreč tako očiten skok zelo verjeten kazalec določenih sprememb v paleookolju: tj. širjenje odprtih habitatov kot posledica poljedelstva in reje drobnice. V to smer kaže več palinoloških analiz (npr. Culiberg 1995; Šercelj 1996; Andrič 2002), podobne ocene paleookolja pa sta na osnovi ostankov malih sesalcev iz Viktorjevega spodmola oblikovala tudi Toškan in Kryštufek (ta zbornik).

Uporaba odstotkov za izražanje kvantitativnih razmerij med ostanki posameznih taksonov v vzorcu je danes v zooarheologiji splošno uporabljena metoda, ki pa skriva veliko pasti. Tako npr. pojav ostankov nove vrste

16.3 Taphonomy

The main factor of accumulation of animal remains in Viktorjev spodmol was certainly man. By means of taphonomic analysis we thus tried among other things to interpret the reasons for people using the overhang cave at that time. For that purpose, we established the relative frequency of appearance of various groups of skeletal elements in the excavated material, whereby we took into account exclusively the remains of ungulates (Suidae, Cervidae, Bovidae) from the IzA phase. We determined the following groups: horns/antlers, teeth, skull (including *cranium, os maxillare, mandibula*), *ossa coxae*, upper parts of the foreleg (*scapula, humerus, radius, ulna*), lower parts of the foreleg (*ossa carpalia, ossa metacarpalia*), upper parts of the rear leg (*femur, patella, tibia, fibula*), lower part of the rear leg (*astragalus, calcaneus, ossa metatarsalia*) and *phalanges*. We did not include in our analysis parts of the back and neck, which are often mentioned in the literature, since we did not identify vertebrae (except *atlas* and *epistropheus*). As is clear from Fig. 7, teeth and phalanges were most numerous in the sample, remains from the meatiest parts of the body (*ossa coxae*, upper parts of front and rear legs) were relatively rare. We also found a fair number of red deer antler in Mesolithic spits (above 15 % NISP), while in the examined Prehistoric sediments they were not present at all. Nevertheless, viewed overall, differences between the two sub-samples were not statistically significant (α=0.05).

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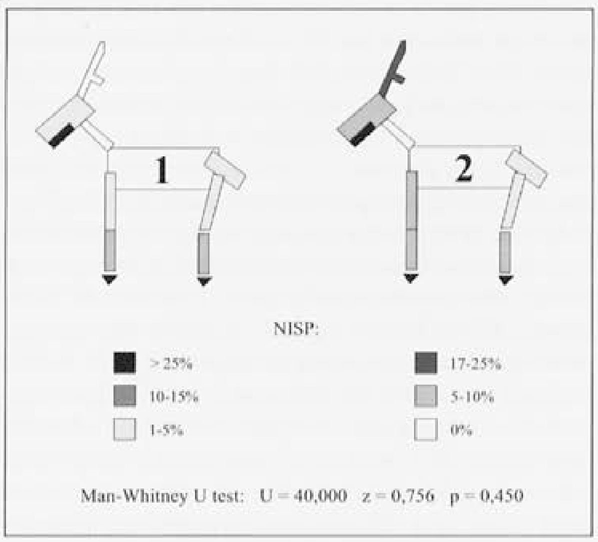
neogibno povzroči zmanjšanje deleža tistih že prisotnih, čeprav ostaja njihova absolutna številčnost dejansko nespremenjena (glej Payne 1972a). Upoštevanje takšnih "fantomskih" sprememb v deležih posameznih vrst pa lahko seveda privede do tudi zelo napačnih sklepov. Da se to v našem primeru ne bi zgodilo, smo mezolitski in prazgodovinski vzorec iz faze IzA primerjali tudi v absolutnem številu ostankov posameznih taksonov (NISP). Kot je razvidno iz slike 16.6 rezultati v celoti potrjujejo že predstavljene ugotovitve: odsotnost domačih živali (z izjemo psa) iz mezolitskih režnjev ter upad številčnosti najdb lovnih živali (jelen, divja svinja, srna) z nastopom prazgodovinskih obdobij. Razviden je tudi skok v številu ostankov poljskega zajca v zgornjih sedmih režnjih.

16.3 Tafonomija

Poglavitni dejavnik akumulacije živalskih ostankov v Viktorjevem spodmolu je bil zagotovo človek. S tafonomsko analizo smo tako poskušali med drugim razbrati vzrok zadrževanja takratnih ljudi v spodmolu. V ta namen smo ugotavljali relativne frekvence pojavljanja različnih skupin skeletnih elementov v izkopanem materialu, pri čemer smo upoštevali izključno ostanke parkljarjev (Suidae, Cervidae, Bovidae) iz faze IzA. Skupine smo opredelili takole: rogovje, zobje, glava (vključuje *cranium, os maxillare, mandibula*), okolčje (*ossa coxae*), zgornji del prednjih nog (*scapula, humerus, radius, ulna*), spodnji del prednjih nog (*ossa carpalia, ossa metacarpalia*), zgornji del zadnjih nog (*femur, patella, tibia, fibula*), spodnji del zadnjih nog (*astragalus, calcaneus, ossa metatarsalia*) ter prsti (*phalanges*). V literaturi sicer večkrat omenjena predela vratu in hrbta v našo analizo nismo vključili, saj vretenc (z izjemo atlasa in epistropheusa) nismo določevali. Kot je razvidno iz slike 7, so bili v našem vzorcu najštevilčnejši zobje in prstnice, razmeroma redki pa so bili ostanki iz sicer najbolj mesnatih delov telesa (okolčje, zgornji deli prednjih in zadnjih nog). V mezolitskih režnjih smo našli tudi precej veliko število fragmentov jelenjih rogov (nad 15 % NISP), medtem ko ti v pregledanem prazgodovinskem sedimentu sploh niso bili prisotni. Kljub temu pa gledano v celoti, razlike med obema podvzorcema niso bile statistično značilne (α=0,05).

V izkopanem materialu iz Viktorjevega spodmola (faza IzA) torej prevladujejo ostanki tistih delov živali, ki vsebujejo majhne količine mesa in maščob. Hkrati lahko iz slike 16.7 razberemo, da je število bolj "mesnatih" skeletnih elementov razmeroma nizko. Takšno razmerje med posameznimi skupinami osteodontoloških najdb navadno povezujemo z lovskimi postajami (npr. Martin 1991; Rowley-Conwy 1996; Miracle *et al.* 2000). Vendar pa to ni edina možnost. Majhno število izkopanih dolgih kosti bi lahko pripisali tudi omejeni površini, s katere so bile pobrane najdbe (skupaj komaj 0,3 m^2)

In the material excavated from Viktorjev spodmol (IzA phase) therefore, remains of those parts of an animal containing small amounts of meat and fat predominate. At the same time, it can be seen from Fig. 16.7 that the number of "meatier" skeletal elements is relatively low. Such a ratio between individual groups of osteodontological finds is normally linked to hunting posts (e.g., Martin 1991; Rowley-Conwy 1996; Miracle *et al.* 2000). However, this is not the only possibility. The small number of excavated long bones could also be ascribed to the limited area from which finds were collected (altogether barely 0.3 m^2) and the use of specific skeletal elements as raw material for making tools. We must also take account of the activities of dogs and other carnivores. These could have an essential impact on the distribution of bones in a space, including those on which gnawing marks are not visible at all (Kent 1981). Together with the aforementioned possibilities, it seems sensible to mention another in the case of Viktorjev spodmol: that a large proportion of the long bones have simply been destroyed. Wet sieving the excavated material during the IzA phase, namely, enabled an insight of the average size and weight of bone fragments. In order to obtain a rather better insight into this segment of the taphonomic analysis, we divided the finds into two size classes: fragments from 3 to 10 mm and those above 10 mm. As is evident from Diagram 16.8, remains smaller than 10 mm predominate in terms of number of pieces per spatial unit, in both Mesolithic and in Prehistoric



Sl. 16.7: Pogostnost (% NISP) ostankov posameznih skupin skeletnih elementov v prazgodovinskem (1) in mezolitskem (2) vzorcu iz Viktorjevega spodmola - faza IzA. Opredelitev posameznih skupin skeletnih elementov je podana v besedilu.

Fig. 16.7: Frequency (% NISP) of remains of individual groups of skeletal elements in the Prehistoric (1) and Mesolithic (2) samples from Viktorjev spodmol - IzA phase. Specification of individual groups of skeletal elements is given in the text.

ter uporabi določenih skeletnih elementov kot surovine za izdelavo orodij, upoštevati pa moramo tudi aktivnost psov in drugih zveri. Te namreč lahko bistveno vplivajo na razporeditev kosti v prostoru, tudi tistih, na katerih ostanki zob sicer sploh niso opazni (Kent 1981). Ob navedenih možnostih pa se zdi v primeru Viktorjevega spodmola smiselno omeniti še eno: da je bil namreč velik del dolgih kosti preprosto uničen. Spiranje izkopanega materiala med fazo IzA je namreč omogočalo vpogled v povprečno velikost in maso kostnih fragmentov. Da bi dobili nekoliko boljši vpogled v ta segment tafonomske analize, smo najdbe razdelili v dva velikostna razreda: fragmenti velikosti od 3 do 10 mm ter tisti nad 10 mm. Kot je razvidno iz razpredelnice 16.8, po številu kosov na prostorninsko enoto prevladujejo ostanki, manjši od 10 mm, in to tako v mezolitskem, kot tudi v prazgodovinskem podvzorcu. Pri tem kaže tudi dodati, da se nad pet centimetrov veliki ostanki v izkopanem materialu pojavljajo le sporadično, pri čemer med obema podvzorcema ni statistično značilnih razlik (Mann-Whitneyjev U-test: $p > 0{,}05$).

Glede na očitno fragmentiranost materiala se je vsekakor smiselno vprašati o dejavnikih, ki so odgovorni za to. S ciljem oceniti vlogo poodložitvenega razpadanja kosti na sedimentu in v njem (glej Von Endt in Ortner 1984) smo tako najprej analizirali ohranjenost kostne substance. Izkazalo se je, da na površini izkopanih kosti praviloma ni zaslediti očitnejših znakov razpadanja, ki bi ga lahko pripisali izpostavljenosti spreminjajočim se mikroklimatskim pogojem. Na osnovi kriterijev, ki jih je za kvantifikacijo navedenih površinskih sprememb na kosti predstavila Behrensmeyerjeva (1978), smo večino najdb namreč uvrstili v stopnjo nič in ena. Zanimal nas je tudi obseg soodvisnosti med pogostnostjo posameznih skeletnih elementov v vzorcu in njihovo strukturno gostoto. V kolikor bi namreč na drobljenje kostnega materiala vplivali predvsem fizikalni in kemični dejavniki v sedimentu, bi bilo med določljivimi fragmenti smiselno pričakovati veliko število ostankov z relativno veliko strukturno gostoto, saj so ti obstojnejši (Lyman 1985; 1999). Analizo smo opravili ločeno za mezolitski (N=102) in prazgodovinski (N=89) vzorec iz faze IzA, pri čemer smo podatke o strukturni gostoti

sub-samples. It is worth adding here that remains larger than 5 centimetres only sporadically appear in excavated material, by which there is no statistically significant difference between the two sub-samples (Mann-Whitney U-test: $p > 0.05$).

In view of the clear fragmentation of the material it certainly makes sense to ask about factors that are responsible for this. In order to assess the role of post-depositional disintegration of bones on the surface and in the sediment (*cf.* Von Endt and Ortner 1984) we thus first analysed the preservation of the bone substances. It appeared that on the surface of excavated bones there is generally no trace of weathering. On the basis of criteria that Behrensmeyer (1978) presented for the quantification of this type of surface changes on bones, we classified the majority of finds at the level of nought or one. We were also interested in the extent of interdependence between the frequency of individual skeletal elements in the sample and their structural density. Insofar as mainly physical and chemical factors in the sediment influenced the crumbling of bone material, it would be sensible to expect among identified fragments a large number of remains with a relatively high structural density, since these are more persistent (Lyman 1985; 1999). We performed analysis separately for the Mesolithic (N=102) and Prehistoric (N=89) sub-samples from the IzA phase, whereby we took data on the structural density of individual skeletal parts from Lyman (1999). We tested the dependence between the frequency of individual skeletal elements in the sample and their structural density with non-parametric statistical measurement of correlation (Spearman's r). The results excluded the existence of strong statistically significant correlations both in the Mesolithic (Spearman's $r = -0.30$; $p > 0.05$) and in the Prehistoric (Spearman's $r = 0.39$; $p < 0.05$) sub-samples.

The value of the Completeness Index (CI), which attempts to assess the influence of abiotic post-depositional factors on the fragmentation of bones by analysis of the completeness of skeletal elements that are unlikely to have been fragmented by man or animals (i.e., *ossa carpalia* and *tarsalia*; Marean 1991), is also in agreement with this. The high value for the whole sample from Vik-

Razpredelnica 16.8: Povprečno število in masa živalskih ostankov na volumensko enoto sedimenta mezolitskih oz. prazgodovinskih režnjev Viktorjevega spodmola (faza IzA). Podatki so podani za ostanke dveh velikostnih razredov: 3–10 mm ter nad 10 mm.

Table 16.8: Average number and weight of animal remains per volumetric unit of sediment of Mesolithic and Prehistoric spits of Viktorjev spodmol (IzA phase). Data are given for the remains of two size classes: 3–10 mm and above 10 mm.

Enota Unit	Vel. razred Size class	Režnji 1–7 Spits 1–7	Režnji 10–19 Spits 10–19	χ^2 test	
N/dm^3	3–10 mm	239,3	330,4	} $\chi^2 = 0{,}653$	p>0,884
N/dm^3	10– mm	79,7	123,7		
g/dm^3	3–10 mm	44,2	85,6	} $\chi^2 = 0{,}036$	p>0,998
g/dm^3	10– mm	59,6	116,2		

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posameznih skeletnih delov povzeli po Lymanu (1999). Soodvisnost med pogostnostjo posameznih skeletnih elementov v vzorcu in njihovo strukturno gostoto smo testirali z neparametrično statistično mero korelacije (Spearmanov r). Rezultati so izključili obstoj omembe vrednih statistično značilnih korelacij tako v mezolitskem (Spearmanov r = -0,30; p > 0,05) kot tudi prazgodovinskem (Spearmanov r = 0,39; p < 0,05) vzorcu.

Skladna s tem je tudi vrednost indeksa celovitosti (CI; *Completness Index*), ki poskuša oceniti vpliv abiotskih poodložitvenih dejavnikov na drobljenje kosti z analizo celovitosti tistih skeletnih elementov, katerih razbijanje s strani človeka in živali ni verjetno (tj. *ossa carpalia* in *tarsalia*; Marean 1991). Njegovo visoko vrednost za celoten vzorec iz Viktorjevega spodmola (CI=88,5 %) lahko nedvomno razumemo kot dodaten dokaz v prid tezi, da fragmentiranosti kostnega materiala v našem primeru ne gre pripisati poodložitvenim dejavnikom, temveč predvsem načrtnemu delovanju človeka. Ta je z razbijanjem kosti laže prišel do maščob, ki so ostale v njih tudi še po odstranitvi kostnega mozga (npr. Jones in Metcalfe 1988). Zdrobljene epi- in diafize dolgih kosti je lahko uporabil za pripravo nekakšne juhe ali "koščenega soka" (*bone juice*; Rowley-Conwy 1996), preostanek pa tudi kot kurivo. Seveda so bili pri tem bolj zanimivi tisti skeletni elementi, ki vsebujejo več maščobe. To pa se lepo ujema s podatki na sliki 16.7, kjer prevladujejo prav manj "mesnati" ostanki ter ostanki z manjšo vsebnostjo maščob.

Razumljivo je, da je bila odločitev o razbijanju kosti povezana z vračanjem energije, ki ga je to početje obetalo, ter seveda s količino takrat razpoložljive hrane v skupnosti. Tako lahko pričakujemo, da je bilo drobljenje intenzivnejše v obdobjih pomanjkanja hrane oz. kadar je bila energetska vrednost plena manjša (Jones in Metcalfe 1988). Z namenom ugotoviti morebitne tovrstne razlike med ostanki iz mezolitskih in prazgodovinskih režnjev faze IzA smo primerjali povprečno maso fragmentov obeh podvzorcev (razpredelnica 16.9). Izkazalo se je, da večjih razlik med njima sicer ni, so pa

torjev spodmol (CI=88.5 %) can certainly be understood as additional evidence for the thesis that the fragmentation of the bone material in this case cannot be ascribed to post-depositional factors, but mainly to the planned activity of man. By the breaking of the bones, he more easily reached the fat that remained in them even after the removal of the bone marrow (e.g., Jones and Metcalfe 1988). Fragmented epi- and diaphyses of long bones may have been used for the preparation of a soup or "bone juice" (Rowley-Conwy 1996), and the remainder as fuel. Of course, the skeletal elements that contain more fat would be more interesting for this. This is well illustrated by data in Fig. 16.7, in which precisely less "meaty" remains and remains with smaller fat contents predominate.

The decision on the fragmenting of bones is obviously connected with the return of energy that this behaviour provided and, of course, with the quantity of food then available in the community. We can thus expect that such fragmentation would have been more intensive in periods of food shortage or when the energy value of prey was less (Jones and Metcalfe 1988). In order to determine possible such differences between remains from Mesolithic and Prehistoric spits of the IzA phase, we compared the average weight of fragments of the two sub-samples (Table 16.9). It appeared that there is no major difference between them, although fragments from Prehistoric excavations are nevertheless statistically significantly larger (Fig. 16.8). It is therefore worth asking whether the established extent of difference is already such that it would be sensible to interpret it as a result of planned greater or lesser intensity of fragmenting bones. It is doubtful, namely, that the extraction of fat from the on average barely 0.4 g lighter (and thus correspondingly smaller) fragments is essentially more effective.

It can also be concluded from Fig. 16.8 that the burned fragments are within the same size class, being either only slightly smaller (size class above 1 cm) or even somewhat larger (3-10 mm) than those that are

Razpredelnica 16.9: Opisna statistika za povprečno število koščenih fragmentov na reženj mezolitskega (r. 10-19) in prazgodovinskega (r. 1-7) podvzorca. Podani sta tudi povprečni masi fragmentov (X). Podatki se nanašajo izključno na ostanke iz faze IzA.

Table 16.9: Descriptive statistics for the average number of bone fragments in spits of the Mesolithic (spits 10-19) and Prehistoric (spits 1-7) sub-samples. The average weights of fragments are also given (X). Data refer exclusively to remains from the IzA phase.

Režnji Spits	Statistike Statistics	Fragmenti 3–10 mm Fragments 3–10 mm		Fragmenti nad 10 mm Fragments over 10 mm		Določljivi fragmenti Determinable fragments	
		N	X	N	X	N	X
1–7 (N=13)	Me	78	0,21	26	1,21	9,5	1,59
	25–75 %	54–88	0,19–0,22	23–27	1,03–1,41	6–12	1,08–2,57
	min–max	26–119	0,16–0,32	15–34	0,90–2,48	1–19	0,30–6,63
10–19 (N=17)	Me	187	0,17	70	0,99	7,5	4,79
	25–75 %	88–215	0,09–0,18	16–84	0,80–1,17	1–12	2,26–7,53
	min–max	33–329	0,05–0,21	4–164	0,23–1,93	0–20	0,11–14,08

fragmenti iz prazgodovinskih izkopov vseeno statistično značilno večji (sl. 16.8). Vredno se je torej vprašati, ali je ugotovljen obseg razlik že tolikšen, da bi ga bilo smiselno interpretirati kot posledico načrtno večje oz. manjše intenzivnosti drobljenja kosti. Obstajajo namreč dvomi o tem, da je ekstrakcija maščobe iz v povprečju komaj 0,4 g lažjega (in torej ustrezno manjšega) fragmenta bistveno učinkovitejša.

Iz slike 16.8 lahko razberemo tudi to, da so ožgani fragmenti znotraj istega velikostnega razreda bodisi le malenkost manjši (razred velikosti nad 1 cm) bodisi celo nekoliko večji (3-10 mm) od tistih neožganih. Ugotovitev je zanimiva ob upoštevanju dejstva, da izpostavljenost visokim temperaturam (ognju) zmanjša trdnost kosti. Tako bi lahko nastanek množice majhnih ožganih drobcev iz našega vzorca pripisali predvsem drobljenju večjih že ožganih fragmentov zaradi delovanja poodložitvenih abiotskih dejavnikov. Navsezadnje ožgane kosti ni mogoče vedno povezovati s pripravo in uživanjem hrane, saj so bili lahko koščeni drobci izpostavljeni ognju tudi pozneje (Stiner in Kuhn 1995). Vendar pa se zdi ob upoštevanju ugotovitev iz slike 16.8 vseeno verjetnejša domneva, da je za nastanek pretežnega dela drobnih ožganih fragmentov odgovoren človek z načrtnim razbijanjem še neožganih kosti, pri čemer naj bi bila izpostavljenost ognju šele sekundarna.

Na koncu je treba omeniti tudi številne kostne fragmente, manjše od 3 mm, ki pripadajo izključno velikim sesalcem. Ti fragmenti so v vseh mezolitskih režnjih. Na podlagi številnih v ognju kalciniranih in ožganih primerkov sklepamo, da so vsaj nekateri kostni drobci, če ne vsi, nastali sinsedimentno. To pomeni, da majhni kostni fragmenti niso nastali izključno s preperevanjem v postsedimentnem obdobju, kot običajno razlagajo, temveč predvsem z namernim drobljenjem kosti.

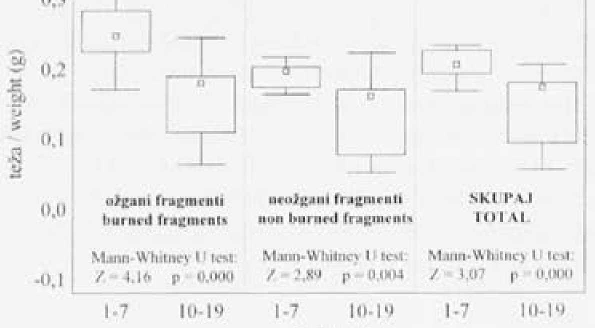
Kostne fragmente, manjše od 3 mm, smo kvantificirali v režnju 11 in 13 v frakciji sedimenta 1mm < x < 3

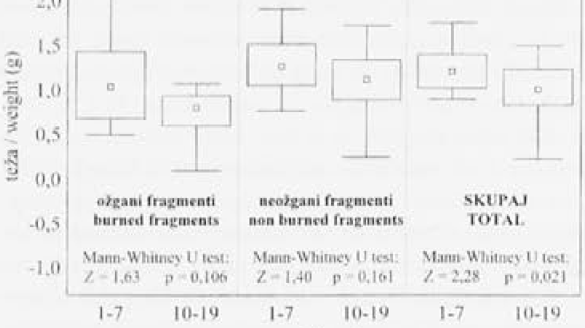
not burnt. The finding is interesting bearing in mind that exposure to high temperature (fire) reduces the hardness of bones, thus the creation of a mass of small charred fragments from our sample could be ascribed mainly to fragmentation of already burned fragments because of the activity of post-depositional abiotic factors. After all, burned bones cannot always be linked to the preparation and eating of food, but can also be of post-depositional origin (Stiner and Kuhn 1995). However, taking into account the findings from Fig. 16.8, it seems at least more probable to suspect that man was responsible for the creation of the predominant part of the small charred fragments, with the deliberate breaking of still unburned bones, by which exposure to fire would only have been secondary.

It must be stressed at the end also the numerous bone fragments less than 3 mm that belong exclusively to large mammals. These fragments are in all Mesolithic spits. On the basis of the number of specimens calcified and charred in fire, we conclude that at least some of the bone fragments, if not all, were created synsedimentationally. This means that small bone fragments were not created exclusively by weathering in the post-sedimentational period, as is normally interpreted, but mainly by the deliberate breaking of bones.

We quantified bone fragments smaller than 3 mm in spits 11 and 13 in the fraction of sediment 1mm < x < 3 mm. In spit 11, there was 1.2 g or 165 bone fragments (4.1 weighted % or 5.7 b.f./ml) in 29 ml of sediment , and in spit 13 there was 1.1 g or 138 bone fragments (4.4 weighted % or 5.5 b.f./ml). In the Pleistocene layers of Divje babe I the shares of the same bone fragments in archaeologically sterile layers was 2 weighted %, and in archaeological layers 3.1 weighted % (layer 2), 3.5 weighted % (layer 7), 4.2 weighted % (layer ?12-13) and 3.4 weighted % for the hearth in layer 19/20.

The small bone fragments differ in terms of colour,





Sl. 16.8a, b: Povprečna masa ožganih in neožganih fragmentov kosti in zob velikostnega razreda 0,3 do 1 cm (a) oz. nad 1 cm (b).

Fig. 16.8a, b: Average weight of burnt and unburnt fragments of bones and teeth of size class 0.3 to 1 cm (a) or above 1 cm (b).

mm. V režnju 11 je bilo v 29 ml sedimenta 1,2 g ali 165 kostnih drobcev (4,1 težna % ali 5,7 k.d./ml), v režnju 13 pa je bilo v 25 ml sedimenta 1,1 g ali 138 kostnih drobcev (4,4 težna % ali 5,5 k.d./ml). V pleistocenskih plasteh Divjih bab I so deleži enakih kostnih drobcev v arheološko sterilnih plasteh 2 težna %, v arheoloških plasteh pa 3,1 težna % (plast 2), 3,5 težna % (plast 7), 4,2 težna % (plast ?12-13) in 3,4 težna % za ognjišče v plasti 19/20.

Majhni kostni drobci se razlikujejo po barvi, kar povezujemo z različnimi sedimentnimi mikrookolji. Med njimi so tudi zeleno obarvani. Zaradi suma bakrenega volka smo dva primerka kemično analizirali. Analiza je pokazala, da sum ni bil utemeljen. Kemični elementi so v zeleno obarvanih kosteh zastopani v naslednjem vrstnem redu: Ca, P, Ar, K, Fe, Mn, Zn, Ti in Cu. Analizo je opravil Žiga Šmit (Inštitut Jožefa Stefana, Slovenija), za kar se mu najlepše zahvaljujeva.

16.4 Paleoekonomija

Ocena ekonomske baze preteklih skupnosti iz Viktorjevega spodmola ni mogoča, saj je množina razpoložljivega materiala za kaj takega premajhna. Brez dvoma lahko sicer trdimo, da je bil za mezolitskega človeka lov poglavitni vir živalskih maščob. Prav tako ne gre dvomiti o vodilni vlogi jelena med lovnimi živalmi, ki sta mu sledila še divji prašič in verjetno srna. Tudi to, da so manjše živali (npr. divja mačka, lisica, jazbec, zajec) plenili predvsem zaradi njihovih kožuhov, ne bi smelo biti sporno. Se pa lahko v zvezi s t. i. majhnim plenom upravičeno vprašamo, v kolikšni meri je številčnost najdb sploh smiselno povezovati s človekom. Mnoge od naštetih živali so namreč lahko spodmol in njegovo bližnjo okolico uporabljale kot brlog ali lovišče (npr. Miracle 1997). Na osnovi ostankov velikih sesalcev lahko za zdaj le malo povemo npr. tudi o sezoni, dolžini in namenu zadrževanja človeka v spodmolu.

Vprašanja brez jasnih odgovorov so še številnejša v primeru prazgodovinskega podvzorca. Iz razpoložljivega kostnega materiala namreč ni mogoče zanesljiveje oceniti pomena posameznih vrst domačih živali znotraj takratnih skupnosti, še manj pa namen, s katerim so jih gojili. Na osnovi podatkov iz razpredelnic 16.1 in 16.4 bi sicer lahko sklepali, da je bila takrat najpomembnejša domača žival ovca in da sekundarni produkti reje drobnice za takratne ljudi še niso imeli večjega pomena. Domnevna starost živali ob zakolu je bila namreč v Viktorjevem spodmolu razmeroma nizka, kar kaže na rejo drobnice usmerjeno v produkcijo mesa. Obe tezi se lepo ujemata tudi s podatki iz nekaterih drugih približno sočasnih najdišč s Krasa (npr. Turk *et al.* 1992; Turk *et al.* 1993; Petrucci 1997; Boschin in Riedel 2000). Vendar pa njuna dejanska potrditev brez analiz dodatnega materiala ni mogoča (glej Payne 1972a).

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which we associate with various sedimentation microenvironments. They include those coloured green. Because of the suspicion of patinating we analysed two specimens chemically. The analysis showed that the suspicion was not well founded. The chemical elements in the green coloured bones are represented in the following order: Ca, P, Ar, K, Fe, Mn, Zn, Ti and Cu. The analysis was performed by Žiga Šmit (Jožef Štefan Institute, Slovenia), for which we are very grateful.

16.4 Paleoeconomy

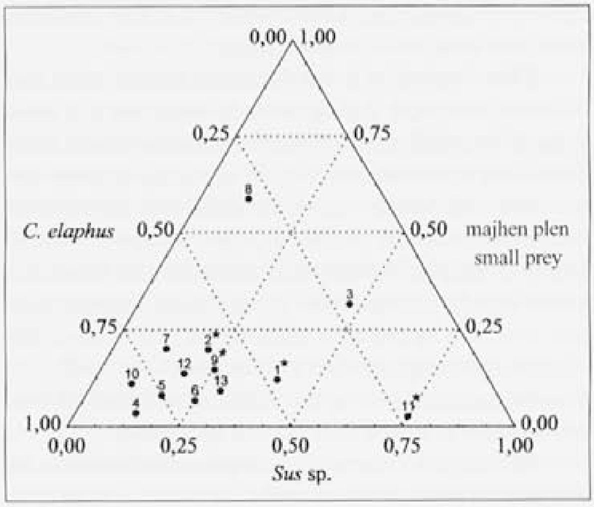
An assessment of the economic base of past communities from Viktorjev spodmol is not possible since the mass of available material is too small for such an assessment. We can, however, undoubtedly state that hunting was the main source of animal meat and fats for Mesolithic man. Similarly, it cannot be doubted that red deer had a leading role in terms of game, followed by wild boar and probably roe deer. That small animals (e.g., wild cat, fox, badger, hare) were hunted mainly for their fur can also not be disputed. In connection with so-called small game, we can justifiably ask to what extent the number of finds can sensibly be linked with mankind at all. Many of the enumerated animals could have used the overhang cave and its immediate surroundings as a lair or hunting ground (e.g. Miracle 1997). On the basis of the remains of large mammals, we can only say little so far about the season, length and purpose of mankind being in the overhang cave.

In the case of the Prehistoric sub-sample, the questions without clear answers are even more numerous. From available bone material, namely, a more reliable assessment of the importance of individual species of domestic animals within the then community cannot be concluded, still less the purpose for which they reared them. On the basis of data from Tables 16.1 and 16.4, it could be concluded that the then most important domestic animal was sheep and that secondary products of rearing ovicaprines did not have major importance for the people then. The presumed age of animals in Viktorjev spodmol at the time of death was relatively low, which indicates the breeding of ovicaprines directed at meat production. Both theses correspond well with data from certain other nearby contemporary sits on the Kras (e.g., Turk *et al.* 1992; Turk *et al.* 1993; Petrucci 1997; Boschin and Riedel 2000). However, they cannot actually be confirmed without the analysis of additional material (*cf.* Payne 1972a).

16.5 Alopatric Comparison

The temporal determination of finds from the upper seven spits of Viktorjev spodmol (IzA phase) is fairly

16.5 Alopatrične primerjave



Sl. 16.9: Deleži (% NISP) ostankov jelena (*Cervus elaphus*), prašiča (*Sus* sp.) in majhnega plena (tj. *Lepus*, *Mustela*, *Martes*, *Meles*, *Lutra*, *Felis*, *Lynx* in *Vulpes*) v paleontoloških vzorcih iz različnih najdišč Krasa in sosednjih regij. Zvezdica (*) označuje najdišča, kjer je bil material pred pregledovanjem spran. Identifikacija simbolov: 1 - Viktorjev spodmol (režnji 10-19), 2 - Pupićina peć pod Učko (N=5.177; Miracle 1997), 3 - Pod Črmukljo pri Šembijah (N=30; Pohar 1986), 4 - Breg-Škofljica pri Ljubljani (N=107; Pohar 1984), 5 - Mala Triglavca pri Divači (N=370; Pohar 1990), 6 - Šebrn Abri pod Učko (N= 521; Miracle *et al.* 2000), 7 - Želvina jama pri Briščikih - *Grotta della tartaruga* (N=130; Cremonesi 1984), 8 - *Grotta Lonza* (N=130; Meluzzi *et al.* 1984), 9 - Pečina na Leskovcu pri Samatorci - *Grotta azzurra* (N=222; Cremonesi *et al.* 1984), 10 - Jama na Sedlu pri Šempolaju - *Grotta Benussi* (N=671; Riedel 1975), 11 - Pečina pri Bjarču v dolini Nadiže - *Riparo di Biarzo* (N=972; Rowley-Conwy 1996), 12 - Stenašca pri Praproti - *Grotta dell'Edera* (N=142; Boschin in Riedel 2000) ter 13 - Riparo Gaban pri Trentu (N=461; Kozlowski in Dalmeri 2002).

Fig. 16.9: Shares (% NISP) of remains of red deer (*Cervus elaphus*), boar (*Sus* sp.) and small game (i.e., *Lepus*, *Mustela*, *Martes*, *Meles*, *Lutra*, *Felis*, *Lynx* and *Vulpes*) in palaeontological samples from various sites on the Kras and neighbouring regions. An asterisk (*) marks a site where the material was sieved before examination. Identification of symbols: 1 - Viktorjev spodmol (spits 10-19), 2 - Pupićina peć below Učka (N=5.177; Miracle 1997), 3 - Pod Črmukljo by Šembije (N=30; Pohar 1986), 4 - Breg-Škofljica by Ljubljana (N=107; Pohar 1984), 5 - Mala Triglavca by Divača (N=370; Pohar 1990), 6 - Šebrn Abri below Učka (N= 521; Miracle *et al.* 2000), 7 - Želvina jama by Briščiki - *Grotta della tartaruga* (N=130; Cremonesi 1984), 8 - *Grotta Lonza* (N=130; Meluzzi *et al.* 1984), 9 - Pečina na Leskovcu by Samatorca - *Grotta azzurra* (N=222; Cremonesi *et al.* 1984), 10 - Jama na Sedlu by Šempolaj - *Grotta Benussi* (N=671; Riedel 1975), 11 - Pečina pri Bjarču in the valley of the Nadiža - *Riparo di Biarzo* (N=972; Rowley-Conway 1996), 12 - Stenašca by Praprot - *Grotta dell'Edera* (N=142; Boschin and Riedel 2000) and 13 - Riparo Gaban by Trento (N=461; Kozlowski and Dalmeri 2002).

loose. We must be aware in this that essential differences exist between different time periods of prehistory, in, e.g., the importance of breeding livestock, their level of development, the (non)exploitation of various secondary products, and not least, also in the role of hunting itself (e.g., Bökönyi 1974). All this is, of course, reflected in the specificity of archaeozoological samples of different periods, which are not therefore completely comparable. Because of this, in this contribution we have limited ourselves in the presentation of a comparison of our findings with those from a number of other contemporary sites in the region exclusively to the temporally satisfactorily placed Mesolithic sample (IzA phase). We are far from thus avoiding all the difficulties. Above all, mention must be made of the problem of different methods and techniques of excavation and sampling used at individual sites. This is potentially a very disruptive factor, which could have an essential impact on the final conclusions (e.g., Payne 1972b). Because of the aforementioned, we also did not state the number of remains of each individual species individually. Instead of this, we preferred to compare the share of red deer and (wild) boar, together with roe deer the then two main hunted animals, with the share of all so-called small game together (*Lepus*, *Mustela*, *Martes*, *Meles*, *Lutra*, *Felis*, *Lynx* and *Vulpes*).

It appeared that the majority of the sites form a uniform group (Fig. 16.9). The Mesolithic sample from Viktorjev spodmol also does not essentially differ. It is true that in our case the share of remains of the genus *Sus* is slightly higher than elsewhere, but this could also be a result of overestimation because of the way of quantifying the finds. Among the group of 50 excavated remains of wild boar, some 32 percent of all finds were teeth (with red deer only 6.8%). The same applies to phalanges, of which we counted 17 (34 %; Table 16.2). Since we expressed the number of remains of individual taxa with the number of identified specimens (NISP), we did not attempt to assess to how many animals the excavated skeletal elements could belong (*cf.* Grayson 1984). Certainly such a large share of boar teeth among all the excavated finds of this species allows the possibility that these actually belonged to a relatively small number of animals.

16.6 Instead of a Conclusion

We already mentioned that the relatively modest number of available finds from Viktorjev spodmol put in question many of the theses and interpretations presented above. There was the additional difficulty that the material was collected in three successive phases of excavations, using different techniques and methods. The fact that they could not be compared meant that we were prevented from creating a uniform (and thus larger) sam-

Časovna opredelitev najdb iz zgornjih sedmih režnjev Viktorjevega spodmola (faza IzA) je dokaj ohlapna. Pri tem se moramo zavedati, da obstajajo med različnimi časovnimi obdobji prazgodovine bistvene razlike v npr. pomenu živinoreje, njeni razvojni stopnji, (ne)izkoriščanju različnih sekundarnih produktov in ne nazadnje tudi v sami vlogi lova (npr. Bökönyi 1974). Vse to seveda odseva v specifičnosti arheozooloških vzorcev različnih obdobij, ki zato niso povsem primerljivi. Zaradi tega smo v tem prispevku predstavljeno primerjavo naših ugotovitev s tistimi iz več drugih sočasnih najdišč v regiji omejili izključno na časovno zadovoljivo umeščen mezolitski vzorec (faza IzA). S tem pa še zdaleč nismo zaobšli vseh težav. Predvsem moramo omeniti problematiko različnih metod in tehnik izkopavanj ter vzorčenj, ki so bile uporabljene na posameznih najdiščih. Gre namreč za potencialno zelo moteč dejavnik, ki lahko bistveno vpliva na končne sklepe (npr. Payne 1972b). Zaradi navedenega tudi nismo navajali številčnosti ostankov vsake posamezne vrste posebej. Namesto tega smo delež jelena in (divjega) prašiča, ob srni takratnih dveh poglavitnih lovnih živalih, raje primerjali z deležem vsega t. i. majhnega plena skupaj (*Lepus, Mustela, Martes, Meles, Lutra, Felis, Lynx* in *Vulpes*).

Izkazalo se je, da večji del najdišč oblikuje enotno skupino (sl. 16.9). Od nje se bistveno ne razlikuje niti mezolitski vzorec iz Viktorjevega spodmola. Res je sicer, da je v našem primeru delež ostankov rodu *Sus* nekoliko višji kot drugje, vendar bi to lahko bila tudi posledica precenjenosti zaradi načina kvantifikacije najdb. Med skupno 50 izkopanimi ostanki divjega prašiča je bilo namreč kar 32 odstotkov vseh najdb zob (pri jelenu le 6,8 %). Podobno velja za prstnice, ki smo jih našteli 17 (34 %; razpredelnica 16.2). Ker smo številčnost ostankov posameznih taksonov izrazili s številom določenih primerkov (NISP), nismo poskusili oceniti, kolikim živalim bi izkopani skeletni elementi lahko pripadali (glej Grayson 1984). Vsekakor pa tako velik delež prašičjih zob med vsemi izkopanimi najdbami omenjene vrste dopušča možnost, da so ti dejansko pripadali razmeroma majhnemu številu živali.

16.6 Namesto sklepa

Omenili smo že, da razmeroma skromno število razpoložljivih najdb iz Viktorjevega spodmola postavlja pod vprašaj mnoge zgoraj predstavljene teze in interpretacije. Dodatno težavo predstavlja dejstvo, da je bil material zbran v treh zaporednih fazah izkopavanj, ki so se razlikovale po uporabljenih tehnikah in metodah. Njihova neprimerljivost je namreč pozneje onemogočala oblikovanje enotnega (in s tem večjega) vzorca. Smo pa po drugi strani prav zaradi takega načina izkopavanj lahko natančno analizirali prednosti in slabosti posamezne uporabljene metod, s tem pa tudi opozorili na ne-

ple. On the other hand, precisely because of such a method of excavation, we could analyse the advantages and weaknesses of individual methods used, so that we could also draw attention to some traps of which we are sometimes too little aware in our circles.

There is no doubt that the simultaneous collection of bones and teeth during the excavation itself is not a suitable method for collecting the remains of small mammals. Very similar applies for the sampling of macrofauna, since only wet sieving of the sediments enables (although does not also guarantee!) the creation of a representative sample. In order to demonstrate this statement, below we will present some comparisons between samples obtained by classical excavations (i.e., Viktor phase) and those obtained by re-examination of sediment already examined during the Viktor phase, but this time previously wet sieved (Viktor and IzA phase).

Perhaps the clearest advantage of sieving is that we obtain a larger number of finds, and thus of course increase the informative value of the sample itself. In addition, it should not be overlooked that wet sieving essentially changes the ratio between the shares of skeletal elements of individual species (Table 16.10; Fig. 16.10). Thus the classical way of collecting the remains from sediments enables obtaining a larger share of long bones of large mammals (e.g., red deer, bison, pig) and lower and upper jaws, while all other skeletal elements were clearly underestimated. Re-examination of excavated sediments by a professionally more proficient examiner contributed to a partial completing of the sample, in the main by the addition of isolated teeth and a small number of phalanges, carpal and tarsal bones, mainly of larger animals. Only with wet sieving and examination of the material under a dissecting microscope was it possible to collect from the sediment the majority of remains of smaller animals (*Lepus, Mustela, Martes, Meles, Lutra, Felis, Lynx* and *Vulpes*) and the remaining phalanges, and carpal and tarsal bones. It is therefore clear that without sieving we cannot avoid underestimating the number of smaller skeletal elements in relation to the larger.

Classical excavation and sampling of material without sieving thus normally also leads to an underestimation of the share of bones and teeth of smaller animals in relation to larger ones. The extent of the error depends on which method of quantification of remains we choose; from this point of view, NISP is undoubtedly the least suitable. However, even the use of indices, such as the minimum number of animals (MNI) or the minimum number of animal units (MAU) does not exclude error if the most frequent skeletal element in the sample (on which their calculation is normally based) was not efficiently collected. Irrespective of the method of quantification, we can therefore justifiably expect that by using sampling without wet sieving, we are *a priori* rejecting the possibility of creating a representative sam-katere pasti, ki se jih v naših krogih včasih premalo zavedamo.

Nobenega dvoma ni, da sprotno pobiranje kosti in zob med samim izkopavanjem ni primerna metoda za zbiranje ostankov malih sesalcev. Zelo podobno velja tudi za vzorčenje makrofavne, saj le spiranje sedimenta skozi sita omogoča (čeprav ne tudi zagotavlja!) oblikovanje reprezentativnega vzorca. Da bi dokazali umestnost navedene trditve bomo v nadaljevanju predstavili nekaj primerjav med vzorcem, pridobljenim s klasičnimi izkopavanji (tj. fazo Viktor), in tistim, ki smo ga dobili s ponovnim pregledovanjem med fazo Viktor enkrat že pregledanega sedimenta, a smo ga tokrat predhodno sprali skozi sita (tj. fazo Viktor in IzA).

Morda je najočitnejša prednost spiranja ta, da tako pridobimo večje število najdb, s tem pa se seveda poveča izpovedna vrednost samega vzorca. Poleg tega ne gre spregledati, da spiranje bistveno spremeni razmerja med deleži skeletnih elementov posameznih vrst (razpredelnica 16.10; sl. 16.10). Tako je klasično pobiranje ostankov iz sedimenta sicer omogočalo pridobitev večjega dela dolgih kosti velikih živali (npr. jelena, goveda, prašiča) ter spodnjih in zgornjih čeljustnic, vse druge kategorije pa so bile očitno podcenjene. Ponovno pregledovanje prekopanega sedimenta s strani strokovno bolj podkovanih pregledovalcev je prispevalo k delni izpopolnitvi vzorca, v glavnem z dodatkom izoliranih zob ter manjšega števila prstnic, karpalnih in tarzalnih kosti predvsem večjih živali. Šele s spiranjem in pregledovanjem materiala pod lupo pa je bilo mogoče iz usedlin pobrati večino ostankov manjših živali (*Lepus*, *Mustela*, *Martes*, *Meles*, *Lutra*, *Felis*, *Lynx* in *Vulpes*) ter preostanek prstnic, karpalnih in tarzalnih kosti. Očitno je torej, da se brez spiranja ne moremo izogniti podcenjevanju številčnosti manjših skeletnih elementov na račun večjih.

Klasično izkopavanje in vzorčenje materiala brez spiranja tako navadno privede tudi do podcenjevanja

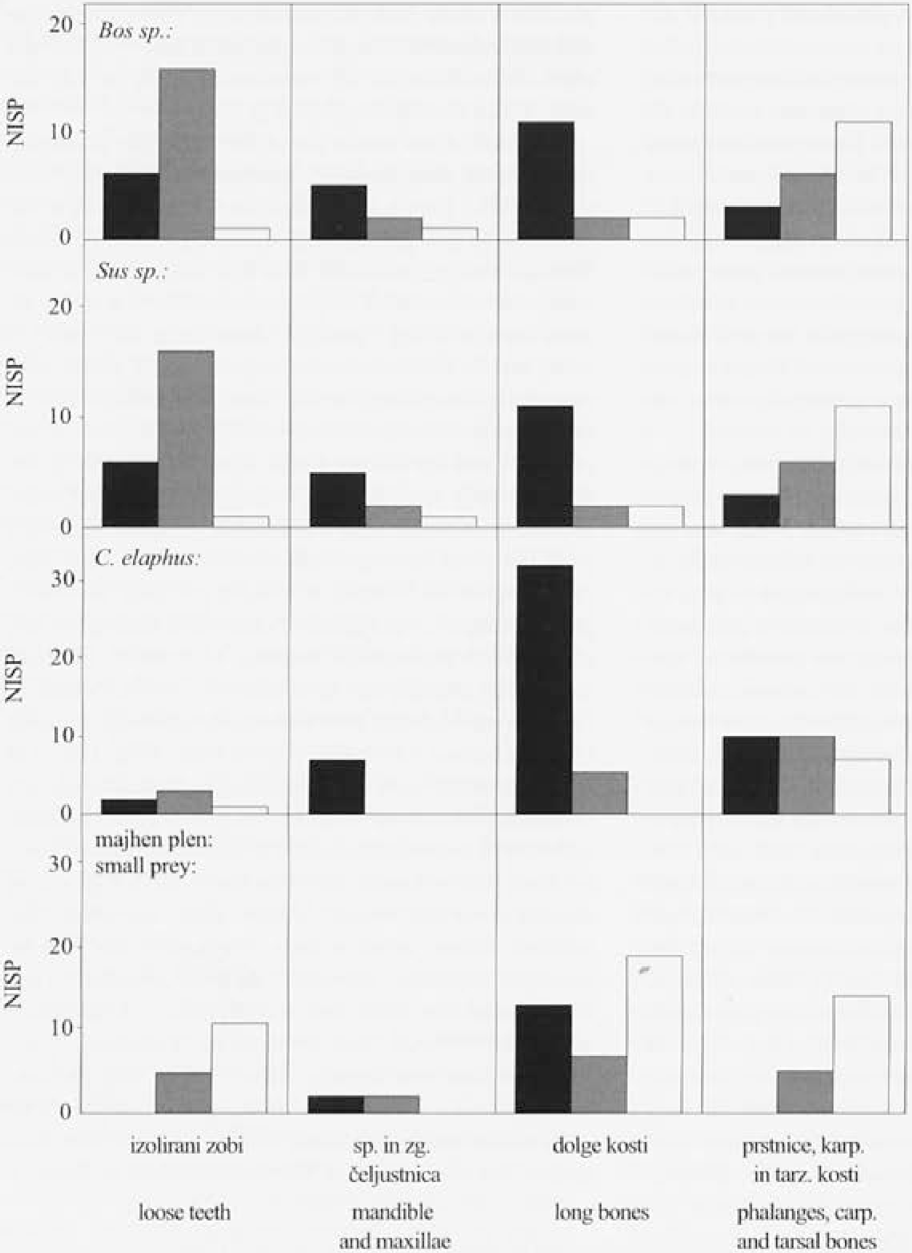
ple. Thus, in the case of remains from Viktor phase, the share of fragments of smaller animals is barely 20%, while after the addition of all remains obtained by wet sieving, it was almost doubled (Fig. 16.11).

Finally, a few words about the technique of excavation by spits with constant, previously specified dimensions of spit. In general, animal remains are grouped on the basis of phases defined with archaeological finds. Such grouping implies the idea that each characteristic change in a sample of bones corresponds to a characteristic change in e.g., pottery, stone tools, etc., that, in other words, within the same archaeological phase, characteristic change e.g., in the form of livestock rearing, the importance of individual secondary products or the roles of hunting, are not likely. It is not difficult to understand why such thinking is dubious. From that point of view it is better that we analyse different materials from the same site (e.g., pottery, chert, bones etc.) independently of each other. Not least, precisely in Viktorjev spodmol such a method of excavation during the IzA phase, with subsequent analysis of remains of small mammals, enabled the identification of the boundary between ecologically two completely different samples (*cf.* Toškan and Kryštufek, this volume) (Fig. 16.12). It is interesting to note that the aforementioned boundary does not correspond with the "archaeological" boundary between the Mesolithic and Prehistoric spits as given by Turk (this volume). It is true that a sufficiently large sample is needed for such a conclusion, but even if the number of finds is not as large as we would like it to be, such an "impartial" approach can draw attention to certain peculiarities which can be additionally analysed subsequently. It would thus certainly be interesting in the future to study the division shown in Fig. 16.6 between the upper and lower parts of the graph, which flows somewhere along spit seven. Insofar as it is not an artefact of the oscillation of the total number of finds, it

Razpredelnica 16.10: Učinkovitost pobiranja živalskih ostankov pri prvem (sonda 1.) in drugem (sonda 2.) pregledovanju nespranega sedimenta iz faze Viktor ter pri tretjem pregledovanju istega vzorca po predhodnem spiranju (S.). Za obrazložitev glej besedilo.

Table 16.10: Effectiveness of collecting animal remains during the first (test trench 1) and second (test trench 2) examination of non-sieved sediments from Viktor phase and with a third examination of the same sample after prior wet sieving (S.). See text for explanation.

Material Material	*Bos* sp.			*Sus* sp.			*Ovis / Capra*			*Cervus*			Majhen plen Small prey		
	Sonda Trench		S.	Sonda Trench		S.	Sonda Trench		S.	Sonda Trench		S.	Sonda Trench		S.
	1.	2.		1.	2.		1.	2.		1.	2.		1.	2.	
Izolirani zobje Isolated teeth	1	1	--	6	16	1	--	6	2	2	3	1	--	5	11
Sp. in zg. čeljustnica Maxilla & mandibula	1	--	--	5	2	1	--	--	--	7	--	--	2	2	--
Dolge kosti, metapodiji Long bones, metapodia	--	--	--	11	2	2	4	--	--	32	5	--	13	7	19
Prstnice, karp., tarz. kosti Phalan., carp., tars. bones	4	5	--	3	6	11	1	1	--	10	10	7	--	5	14



Sl. 16.10: Učinkovitost pobiranja živalskih ostankov pri prvem (črni stolpiči) in drugem (sivi stolpiči) pregledovanju nespranega sedimenta iz faze Viktor ter pri tretjem pregledovanju istega vzorca po predhodnem spiranju (prazni stolpiči). Za obrazlo-žitev glej besedilo.
Fig. 16.10: Effectiveness of collecting animal remains with the first (black column) and second (grey column) examination of not-sieved sediments from Viktor phase and with the third examination of the same sample after previous wet sieving (empty column). See text for explanation.

deleža kosti in zob manjših živali na račun večjih. Obseg napake je sicer odvisen od tega, kateri način kvantifikacije ostankov izberemo; v tem pogledu je brez dvoma najmanj primeren NISP. Vendar pa tudi uporaba indeksov, kot sta najmanjše število osebkov (MNI) ali pa najmanjše število živalskih enot (MAU), ne izključuje napak, če najpogostejši skeletni element v vzorcu (na katerem navadno temelji njihov izračun) ni bil učinkovito pobran. Ne glede na način kvantifikacije lahko torej upravičeno pričakujemo, da se bomo z vzorčenjem brez spiranja *a priori* odrekli možnosti oblikovanja reprezentativnega vzorca. Tako je bilo tudi v primeru ostankov iz faze Viktor, kjer je bil delež fragmentov manjših živali komaj 20-odstoten, po dodatku vseh ostankov, ki smo jih pridobili s spiranjem, pa se je skoraj podvojil (sl. 16.11).

Ob koncu še nekaj besed o tehniki izkopavanja po

could be perhaps interpreted as a boundary between the Mesolithic and the Prehistoric sample. It is interesting to note that its position in such a case would correspond with the above mentioned boundary between the two samples of small mammals.

Acknowledgement:

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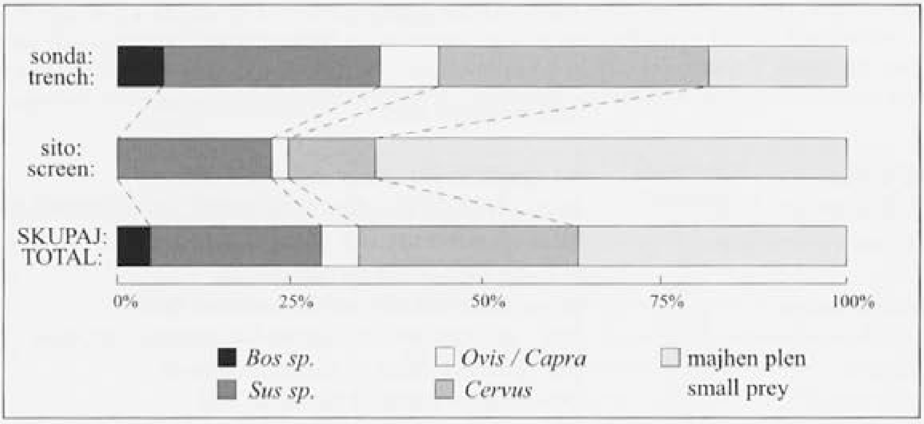
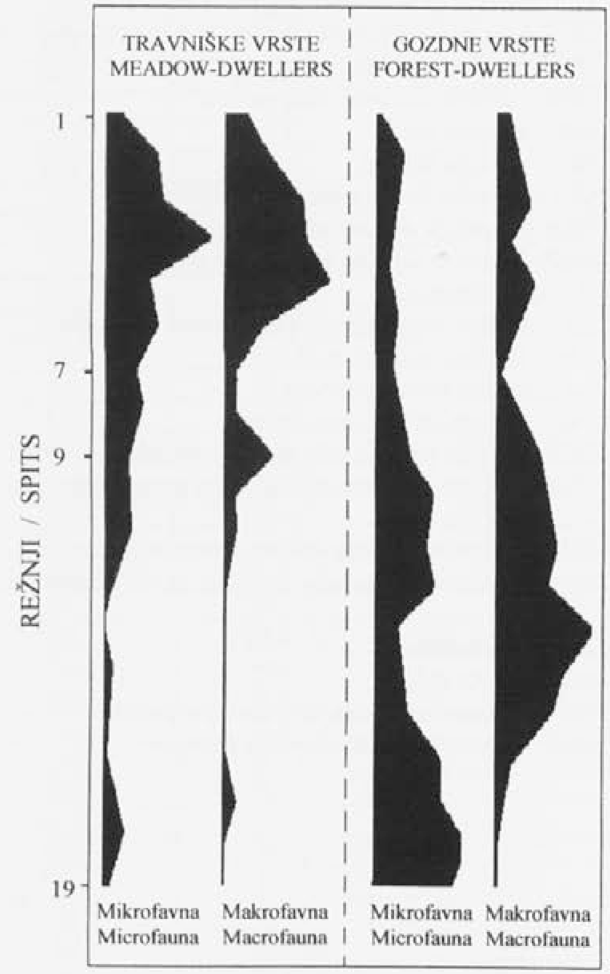


Sl. 16.11: Delež (% NISP) ostankov nekaterih v Viktorjevem spodmolu zastopanih taksonov, pobranih pri klasičnem pregledovanju materiala (sonda) in pri ponovnem pregledovanju istega materiala po spiranju (sito).
Fig. 16.11: Share (% NISP) of remains of some taxa represented in Viktorjev spodmol, with classical examination of material (trench) and with re-examination of the same material after wet sieving (screen).

izkopih s konstantnimi, vnaprej definiranimi dimenzijami režnjev. V splošnem se živalski ostanki grupirajo na osnovi faz, opredeljenih z arheološkimi najdbami. Takšno grupiranje implicira razmišljanje, da se vsaka značilna sprememba v vzorcu kosti časovno ujema z značilno spremembo npr. v keramiki, kamnitem orodju ipd., da torej znotraj iste arheološke faze značilne spremembe npr. v obliki živinoreje, pomenu posameznih sekundarnih produktov ali pa vlogi lova niso verjetne. Povsem razumljivo je, da je takšno razmišljanje sporno. S tega vidika je bolje, da različne materiale iz istega najdišča (npr. keramiko, kremen, kosti ipd.) analiziramo neodvisno drug od drugega. Ne nazadnje je v Viktorjevem spodmolu prav takšen način izkopavanj med fazo IzA pri poznejši analizi ostankov malih sesalcev omogočil identifikacijo meje med dvema ekološko povsem različnima vzorcema (glej Toškan in Kryštufek, ta zbornik) (sl. 16.12). Zanimivo pri tem je, da se ta ne ujema z "arheološko" mejo med mezolitskimi in prazgodovinskimi režnji, kot jo podaja Turk (ta zbornik). Res je sicer, da je za podobne sklepe nujno potreben dovolj obsežen vzorec. A tudi če število najdb ni tako veliko, kot bi si želeli, lahko z "neodvisnim" pristopom opazimo posebnosti, ki jih je mogoče dodatno analizirati v nadaljevanju. Tako bi bilo v bodoče vsekakor zanimivo dodatno proučiti na sliki 16.6 nakazano ločnico med zgornjim in spodnjim delom grafa, ki poteka nekje vzdolž režnja sedem. Koliko ne gre za artefakt nihanja skupnega števila najdb, bi jo bilo morda mogoče interpretirati tudi kot mejo med mezolitskim in prazgodovinskim vzorcem. Zanimivo pri tem je, da bi se njena lega v tem primeru popolnoma ujemala z zgoraj omenjeno mejo med obema vzorcema malih sesalcev.



Sl. 16.12: Vertikalna porazdelitev ostankov na travniške in gozdne habitate vezanih vrst seslacev v Viktorjevem spodmolu, faza IzA.
Fig. 16.12: Vertical distribution of remains of meadow- and forest-dwelling mammal species in Viktorjev spodmol, phase IzA.

Zahvala:

Zahvaljujeva se Ivanu Turku, ki nama je omogočil študij subfosilnega materiala, nama ves čas pomagal s spodbudnimi pogovori in kritično komentiral tudi prvo verzijo besedila. Za omogočen dostop do primerjalne osteološke zbirke Katedre za paleontologijo v okviru Naravoslovno tehniške fakultete gre najina zahvala prof. dr. Vidi Pohar.

16.7 DODATEK

Uporabljene okrajšave:

Bd - največja širina distalnega konca
BFcd - največja širina *facies articularis caudalis*
BFcr - največja širina *facies articularis cranialis*
BG - širina *cavitas glenoidalis*
Bp - največja širina proksimalnega konca
BPC - največja širina *processus coronoideus*-a
DC - največja globina *caput femuris*
Dd - največja globina distalnega konca
DD - najmanjša globina diafize
Dl - največja globina lateralne polovice
DLS - največja diagonalna dolžina temeljne plošče
Dm - največja globina medialne polovice
DPA - globina *processus anconaeus*-a
GB - največja širina
GL - največja dolžina
GLl - največja dolžina lateralne polovice
GLm - največja dolžina medialne polovice
GLP - največja dolžina *processus articularis*
H - višina (height)
LA - dolžina *acetabulum*-a z vključenim robom
Lad - dolžina *arcus dorsalis*
Ld - dolžina hrbtne površine
LG - dolžina *cavitas glenoidalis*-a
M21 - dolžina zobnega niza zgornjih meljakov pri jelenu
M22 - dolžina zobnega niza zgornjih predmeljakov pri jelenu
M23 - največja notranja dolžina orbite pri jelenu
M9 - dolžina zobnega niza spodnjih predmeljakov pri jelenu
m3L - dolžina m3
m3B - širina m3
MBS - širina osrednjega dela temeljne plošče
SLC - najmanjša dolžina *collum scapulae*

VIKTORJEV SPODMOL

16.7 SUPPLEMENT

Abbreviations used:

Bd -greatest breadth of the distal end
BFcd -greatest breadth of the caudal articular surface
BFcr -greatest breadth of the cranial articular surface
BG -breadth of the glenoid cavity
Bp -greatest breadth of the proximal end
BPC -greatest breadth across the coronoid process
DC -greatest depth of the *caput femuris*
Dd -greatest depth of the distal end
DD -smallest depth of the diaphysis
Dl -greatest depth of the lateral half
DLS -greatest diagonal length of the sole
Dm -greatest depth of the medial half
DPA -depth across the *processus anconaeus*
GB -greatest breadth
GL -greatest length
GLl -greatest length of the lateral half
GLm -greatest length of the medial half
GLP -greatest length of the glenoid process
H -height
LA -length of the *acetabulum* including the lip
Lad -ength of the dorsal arch
Ld -length of the dorsal surface
LG -length of the glenoid cavity
M21 -length of the upper molar row; *Cervus*
M22 -length of the upper premolar row; *Cervus*
M23 -greatest inner length of the orbit; *Cervus*
M9 - length of the lower premolar row; *Cervus*
m3L -length of m3
m3B -breadth of m3
MBS -middle breath of the sole
SLC -smallest length of the neck of the scapula

Priloga 16.7.1: Dimenzije izmerjenih ostankov jelena (*Cervus elaphus*). Podani so mediana (Me), variacijska širina (min- max.) ter število meritev (n). Dimenzije in so povzete po Von den Drieschevi (1976). Vse meritve so v mm.
Table 16.7.1: Dimensions of measured remains of red deer (*Cervus elaphus*). Given are median (Me), range (min-max.) and number of measurements (n). Dimensions are according to Von den Driesch (1976). All measurements are in mm.

Faza Phase	Vzorec Sample	Element Element	Dimenzija Dimension	Mediana (n) Median (n)	min–max
Viktor	plast s keramiko layer with sherds	humerus	BT	56 (1)	--
		metacarpus	Bd	42 (1)	--
		phalanx I	Bd	20,5 (1)	--
	plast brez keramike layer without sherds	os maxillare	M21	122,5 (1)	--
			M22	76 (1)	--
			M23	50 (1)	--
		mandibula	M9	48 (1)	--
			m3L	31,25 (2)	31–31,5
			m3B	14 (2)	14–14
		scapula	LG	42 (1)	--
			GLP	58 (1)	--
		humerus	BT	52 (1)	--
		metatarsus	Bp	37 (1)	--
		os centrotarsale	GB	47 (1)	--
		phalanx I	Bp	21,5 (2)	21–22
			Bd	21 (3)	20,5–21,5
		phalanx III	Ld	50,25 (2)	50–50,5
			DLS	52,5 (2)	52–53
			MBS	16,25 (2)	16–16,5
	premešano disturbed	phalanx I	Bp	23 (1)	--
			Bd	23 (1)	--
		ossa coxae	LA	61 (1)	--
		astragalus	GLl	53,5 (3)	53,5–54,5
			GLm	50 (3)	49,5–50
			Dl	29 (3)	28–29,5
			Dm	30 (3)	29–31
			Bd	33,5 (3)	33–33,5
		calcaneus	GL	119,5 (1)	--
			GB	39,5 (1)	--
		os centrotarsale	GB	46 (1)	--
IzA	režnji 1–7 spits 1–7	phalanx I	Bd	21,5 (1)	--
		os centrotarsale	GB	42,5 (1)	--
	režnji 10–17 spits 10–17	scapula	LG	39,5 (1)	--
			BG	40,5 (1)	--
			SLC	39 (1)	--
		ulna	BPC	29 (1)	--
			DPA	47 (1)	--
		radius	Bp	57 (1)	--
		metacarpus	Bd	47,5 (1)	--
		phalanx I	Bp	19,5 (2)	19–20
			GL	54 (1)	--
		phalanx II	Bp	21 (2)	20–22
			Bd	19 (3)	17–20
			GL	41 (1)	--
		calcaneus	GB	37 (1)	--
		os centrotarsale	GB	42,5 (1)	--

VIKTORJEV SPODMOL

Priloga 16.7.2: Dimenzije izmerjenih ostankov srne (*Capreolus capreolus*). Dimenzije in so povzete po Von den Drieschevi (1976). Vse meritve so v mm.
Table 16.7.2: Dimensions of measured remains of roe deer (*Capreolus capreolus*). Dimensions are according to Von den Driesch (1976). All measurements are in mm.

Faza Phase	Vzorec Sample	Element Element	Dimenzija Dimension	Vrednost Measure
Viktor	plast s keramiko layer with sherds	atlas	BFcr	32
			BFcd	34
			H	29
			LAd	22,5
	Premešano / disturbed	phalanx I	Bp	11
IzA	režnji 10–19 spits 10–19	phalanx I	Bd	9
		phalanx III	Ld	13,5
			DLS	15,5
			MBS	6

Priloga 16.7.3: Dimenzije izmerjenih ostankov psa (*Canis familiaris*). Dimenzije so povzete po Von den Drieschevi (1976). Vse meritve so v mm.
Table 16.7.3: Dimensions of measured remains of dog (*Canis familiaris*). Dimensions are according to Von den Driesch (1976). All measurements are in mm.

Faza Phase	Vzorec Sample	Element Element	Dimenzija Dimension	Vrednost Measure
IzA	režnji 1–7 spits 1–7	phalanx II	Bp	8
			Bd	7,5
			GL	15
	režnji 10–19 spits 10–19	phalanx I	Bp	12

Priloga 16.7.4: Dimenzije izmerjenih ostankov domačega goveda (*Bos taurus*). Dimenzije so povzete po Von den Drieschevi (1976). Vse meritve so v mm.
Table 16.7.4: Dimensions of measured remains of domestic cattle (*Bos taurus*). Dimensions are according to Von den Driesch (1976). All measurements are in mm.

Faza Phase	Vzorec Sample	Element Element	Dimenzija Dimension	Vrednost Measure
Viktor	plast s keramiko layer with sherds	mandibula	M9	56,5
		phalanx I	Bd	32,5
		phalanx II	Bp	30
			Bd	25,5
			GL	44

Priloga 16.7.5: Dimenzije izmerjenih ostankov tura (*Bos* cf. *primigenius*). Podani so mediana (Me), variacijska širina (min-max.) ter število meritev (n). Dimenzije so povzete po Von den Drieschevi (1976). Vse meritve so v mm.
Table 16.7.5: Dimensions of measured remains of aurochs (*Bos* cf. *primigenius*). Given are median (Me), range (min-max.) and number of measurements (n). Dimensions are according to Von den Driesch (1976). All measurements are in mm.

Faza Phase	Vzorec Sample	Element Element	Dimenzija Dimension	Mediana (n) Median (n)	min - max
Viktor	plast brez keramike layer without sherds	phalanx I	Bp	40 (2)	40–40
		phalanx III	MBS	34 (1)	--

Priloga 16.7.6: Dimenzije izmerjenih ostankov divje mačke (*Felis silvestris*). Dimenzije so povzete po Von den Drieschevi (1976). Vse meritve so v mm.
Table 16.7.6: Dimensions of measured remains of wild cat (*Felis silvestris*). Dimensions are according to Von den Driesch (1976). All measurements are in mm.

<table>
<tr><th>Faza
Phase</th><th>Vzorec
Sample</th><th>Element
Element</th><th>Dimenzija
Dimension</th><th>Vrednost
Measure</th></tr>
<tr><td rowspan="4">Viktor</td><td rowspan="2">plast s keramiko
layer with sherds</td><td rowspan="2">femur</td><td>Bp</td><td>17</td></tr>
<tr><td>DC</td><td>7</td></tr>
<tr><td rowspan="2">plast brez keramike
layer without sherds</td><td rowspan="2">humerus</td><td>Bd</td><td>24</td></tr>
<tr><td>BT</td><td>17,5</td></tr>
<tr><td>IzA</td><td>režnji 1–7 / spits 1–7</td><td>astragalus</td><td>GL</td><td>14</td></tr>
</table>

Priloga 16.7.7: Dimenzije izmerjenih ostankov poljskega zajca (*Lepus europaeus*). Podani so mediana (Me), variacijska širina (min- max.) ter število meritev (n). Dimenzije so povzete po Von den Drieschevi (1976). Vse meritve so v mm.
Table 16.7.7: Dimensions of measured remains of hare (*Lepus europaeus*). Given are median (Me), range (min-max.) and number of measurements (n). Dimensions are according to Von den Driesch (1976). All measurements are in mm.

<table>
<tr><th>Faza
Phase</th><th>Vzorec
Vzorec</th><th>Element
Element</th><th>Dimenzija
Dimension</th><th>Mediana (n)
Median (n)</th><th>min–max</th></tr>
<tr><td rowspan="2">Viktor</td><td>plast s keramiko / layer with sherds</td><td>humerus</td><td>Bd</td><td>12 (1)</td><td>--</td></tr>
<tr><td>Premešano / disturbed</td><td>calcaneus</td><td>GB</td><td>11 (1)</td><td>--</td></tr>
<tr><td rowspan="10">IzA</td><td rowspan="9">režnji 1–7
spits 1–7</td><td>mandibula</td><td>višina za m2
height behind m2</td><td>18 (1)</td><td>--</td></tr>
<tr><td>radius</td><td>Bp</td><td>9,75 (2)</td><td>9,5–10</td></tr>
<tr><td rowspan="2">phalanx I</td><td>Bp</td><td>6 (2)</td><td>6–6</td></tr>
<tr><td>Bd</td><td>4 (2)</td><td>4–4</td></tr>
<tr><td rowspan="2">phalanx II</td><td>Bp</td><td>5 (5)</td><td>4–5,5</td></tr>
<tr><td>Bd</td><td>3 (5)</td><td>3–4</td></tr>
<tr><td rowspan="2">tibia</td><td>Bd</td><td>16,5 (1)</td><td>--</td></tr>
<tr><td>Dd</td><td>10 (1)</td><td>--</td></tr>
<tr><td>astragalus</td><td>GL</td><td>16 (3)</td><td>15–16</td></tr>
<tr><td>režnji 10–19 / spits 10–19</td><td>femur</td><td>DC</td><td>9</td><td>--</td></tr>
</table>

Priloga 16.7.8: Dimenzije izmerjenih ostankov kune (*Martes* sp.). Podani so mediana (Me), variacijska širina (min- max.) ter število meritev (n). Dimenzije so povzete po Von den Drieschevi (1976). Vse meritve so v mm.
Table 16.7.8: Dimensions of measured remains of marten (*Martes* sp.). Given are median (Me), range (min-max.) and number of measurements (n). Dimensions are according to Von den Driesch (1976). All measurements are in mm.

<table>
<tr><th>Faza
Phase</th><th>Vzorec
Sample</th><th>Element
Element</th><th>Dimenzija
Dimension</th><th>Mediana (n)
Median (n)</th><th>min–max</th></tr>
<tr><td>Viktor</td><td>premešano
disturbed</td><td>radius</td><td>Bp</td><td>7 (1)</td><td>--</td></tr>
<tr><td rowspan="3">IzA</td><td>režnji 1–7
spits 1–7</td><td>humerus</td><td>BT</td><td>11,25 (2)</td><td>10,5–12</td></tr>
<tr><td rowspan="2">režnji 10–19
spits 10–19</td><td rowspan="2">calcaneus</td><td>GL</td><td>20 (1)</td><td>--</td></tr>
<tr><td>GB</td><td>11 (1)</td><td>--</td></tr>
</table>

Priloga 16.7.9: Dimenzije izmerjenih ostankov drobnice (*Ovis* s. *Capra*). Zvezdica (*) označuje ostanke ovce (*Ovis aries*). Dimenzije so povzete po Von den Drieschevi (1976). Vse meritve so v mm.
Table 16.7.9: Dimensions of measured remains of ovicaprines (*Ovis* s. *Capra*). An asterisk (*) marks the remains of sheep (*Ovis aries*). Dimensions are according to Von den Driesch (1976). All measurements are in mm.

Faza Phase	Vzorec Sample	Element Element	Dimenzija Dimension	Vrednost Value
Viktor	plast s keramiko layer with sherds	os centrotarsale	GB	25
		tibia	Bd	22
			Dd	19,5
Viktor IzA	sito (10 mm) / sieve (10 mm9	m3	m3L	20,5
IzA	režnji 1–7 spits 1–7	radius	Bp	25
		phalanx I	Bp	11
			Bd	10,5
			GL	33
			SD	9
			DD	8
		femur *	Bp	40
			DC	18

Priloga 16.7.10: Dimenzije izmerjenih ostankov rjavega medveda (*Ursus arctos*). Dimenzije so povzete po Von den Drieschevi (1976). Vse meritve so v mm.
Table 16.7.10: Dimensions of measured remains of brown bear (*Ursus arctos*). Dimensions are according to Von den Driesch (1976). All measurements are in mm.

Faza Phase	Vzorec Sample	Element Element	Dimenzija Dimension	Vrednost Measure
Viktor	plast brez keramike / layer without sherds	humerus	BT	60
IzA	režnji 10–19 / spits 10–19	metacarpus II	Bp	15
			Bd	19,5
			GL	76
			SD	12
			DD	9,5

Priloga 16.7.11: Dimenzije izmerjenih ostankov prašiča (*Sus* sp.). Podani so mediana (Me), variacijska širina (min- max.) ter število meritev (n). Dimenzije so povzete po Von den Drieschevi (1976). Vse meritve so v mm.
Table 16.7.11: Dimensions of measured remains of domestic pig / wild boar (*Sus* sp.). Given are median (Me), range (min-max.) and number of measurements (n). Dimensions are according to Von den Driesch (1976). All measurements are in mm.

Faza Phase	Vzorec Sample	Element Element	Dimenzija Dimension	Mediana (n) Median (n)	min–max
Viktor	plast s keramiko layer with sherds	metacarpus V	GL	74 (1)	--
		phalanx I	Bp	15,5 (1)	--
			Bd	11 (1)	--
			GL	31,5 (1)	--
			SD	10 (1)	--
			DD	11 (1)	--
	plast brez keramike layer without sherds	radius	Bp	31,5 (1)	--
		metacarpus III	Bp	20 (1)	--
		metacarpus IV	Bp	20 (1)	--
		astragalus	GLl	53 (1)	--
			GLm	47 (1)	--
			Dl	28,5 (1)	--
			Dm	30,5 (1)	--
			Bd	30 (1)	--
	premešano / disturbed	radius	Bp	34 (1)	--
IzA	režnji 1–7 spits 1–7	phalanx I	Bp	19,5 (1)	--
			Bd	19 (1)	--
			GL	30 (1)	--
		phalanx III	MBS	17 (1)	--
	režnji 10–17 spits 10–17	metatarsus IV	Bp	20,5 (2)	18,5–23,5
		phalanx II	Bp	18,75 (2)	18–19,5
			Bd	14,5 (3)	13,5–14,5
			GL	28,25 (2)	27–29,5
		phalanx III	MBS	13,5 (2)	12–15
			Ld	34 (1)	--
			DLS	33 (1)	--

Priloga 16.7.12: Dimenzije izmerjenih ostankov lisice (*Vulpes vulpes*). Dimenzije so povzete po Von den Drieschevi (1976). Vse meritve so v mm.
Table 16.7.12: Dimensions of measured remains of fox (*Vulpes vulpes*). Dimensions are according to Von den Driesch (1976). All measurements are in mm.

Faza Phase	Vzorec Sample	Element Element	Dimenzija Dimension	Vrednost Measure
Viktor	plast s keramiko layer with sherds	m1	m1L	15
			m1B	6
Viktor IzA	sito (10 mm) sieve (10 mm)	ulna	BPC	10
		calcaneus	GL	31
			GB	11
		astragalus	GL	18
IzA	režnji 1–7 spits 1–7	femur	Bp	16
			Bd	21,5
			DC	12
			GL	128
	režnji 10–19 spits 10–19	phalanx II	Bp	6
			Bd	5
			GL	11

17. Človeški ostanki v Viktorjevem spodmolu

17. Human Remains in Viktorjev Spodmol

Iztok Štamfelj & Ivan Turk

Pri pregledovanju sedimenta Viktorjeve sonde so bili najdeni po ena druga prstnica (medialna falanga) roke in noge ter spodnji levi mlečni sekalec (glej Štamfelj *et al.* v tem zborniku). Pri stratigrafskem izkopavanju profila sonde sta prišli na dan še po ena prva prstnica (proksimalna falanga) roke in noge v režnju 10 in 12[1]. Obe prstnici sta bili najdeni v južnem vogalu sonde pod velikim blokom na robu sonde, ki leži v plasti 2. Domnevamo, da je lastnik prstnic pokopan pod omenjenim blokom.

Medtem ko mlečni sekalec pripada otroku, ki je umrl v starosti 4 do 9 let, pripadajo prstnice osebi, ki je umrla v starosti več kot 17 let. Starost smo določili na podlagi popolnoma zraščenih epifiz z diafizo (Bouville 1987, sl. 11). Gre torej za dve osebi.

Arheološka starost in pripadnost najdb se zgolj na podlagi stratigrafije ne da zanesljivo ugotoviti. Možno je, da najdbe izvirajo iz mezolitskega ali halštatskega groba nekje v bližini.

[1] Pri natančni določitvi prstnic nama je pomagala prof. Marija Stefančič, za kar se ji najlepše zahvaljujeva.

During the examination of the sediment of Viktor's test trench, a medial phalange each of a hand and a foot and the lower left milk incisor were found (see Štamfelj *et al.* in this volume). During the stratigraphic excavation of the profile of the test trench, a further (proximal) phalange each of hand and foot came to light in spits 10 and 12[1]. Both phalanges were found in the south corner of the test trench beneath a large block on the edge of the trench, which lies in layer 2. We suspect that the owner of the phalanges was buried beneath the mentioned block.

While the milk incisor belongs to a child that died at an age of 7 to 8 years, the phalanges belong to a person who died at an age of more than 17 years. We decided the age on the basis of the completely fused epiphysis and diaphysis (Bouville 1987, Fig. 11). There are thus two persons.

The archaeological age and affiliation of the finds cannot be reliably determined only on the basis of stratigraphy. It is possible that the finds derive from a Mesolithic or Halstatt grave somewhere in the vicinity.

[1] Prof. Marija Stefančič assisted in exact identification of the phalanges, for which we are very grateful.

18. Namesto sklepa

18. Intead of a Conclusion

Ivan Turk

Viktorjev spodmol sodi v vseh pogledih med bogatejša mezolitska najdišča južno od Alp in ga lahko postavim ob bok najdiščem v severni in severovzhodni Italiji (Trentino Alto Adige, Tržaški kras). Glede na stroške terenskih raziskav, ki so bili praktično nični, je izkupiček velik, če ga primerjam z nekaterimi podobnimi, sodobnimi in zato zelo dragimi izkopavanji drugje. Tu ne mislim samo na arheološke najdbe, temveč tudi na paleontološke, ki so pomembne za rekonstrukcijo nekdanjega okolja.

Kot primer navajam moderno raziskano obsežno plano mezolitsko najdišče Rottenburg Siebenlinden severno od Alp, kjer so izkopavanja trajala več mesecev in rezultirala v monografski objavi najdišča (Kind 2003). Nemški arheologi so našli in analizirali 138 oz. 99 mikrolitov (Kind 2003, tab. 32-33; sl. 67, 69, 71-73), ki so bistveno večji in tudi drugačni kot mikroliti v Viktorjevem spodmolu, kjer je bilo teh najdb 72 oz. 58 na 100-krat manjši površini. Paleontološke najdbe brez rastlinskih ostankov štejejo v najdišču Siebenlinden 3.503 ostankov. Od tega 2.105 določljivih, ki pripadajo 11 vrstam velikih sesalcev, 3 vrstam malih sesalcev, 4 vrstam ptic, eni vrsti ribe in eni vrsti školjke (Kind 2003, 195ss, tab. 81). V Viktorjevem spodmolu smo na 100-krat manjši površini našli 23.984 ostankov favne. Od tega 6.076 določljivih ostankov (brez 58.000 dermalnih ploščic kuščarjev), ki pripadajo 14 vrstam velikih sesalcev, 30 vrstam malih sesalcev, 13 vrstam mrzlokrvnih vretenčarjev in 47 vrstam mehkužcev. To je jasen dokaz, da je Viktorjev spodmol fenomen, kot so fenomen tudi druga podobna najdišča južno od Alp. Biodiverziteta in bujnost življenja južno od Alp nista primerljivi z osiromašenim svetom na severni strani Alp, vsaj ne v danem primeru. Zato je velik nesmisel, da razlagamo naše najdbe s pomočjo dognanj današnjega razvitega sveta na drugi strani Alp in se ne opremo na lastno znanje in lastne bogate vire, preden nam jih drugi izkoristijo tako rekoč pred nosom. Trdno sem prepričan, da bi lahko drugi marsikaj zvedeli od nas in se tudi marsičesa od nas naučili in ne obratno.

Viktorjev spodmol is from all points of view among the richer Mesolithic sites south of the Alps and can be set alongside sites in northern and north-eastern Italy (Trentino Alto Adige, Triestine Karst). In view of the costs of fieldwork, which were practically nil, the output is large if we compare it with some similar, modern and therefore very expensive excavations elsewhere. I am not thinking only of archaeological finds here but also palaeontological finds, which are important for a reconstruction of the palaeoenvironment.

As an example, I cite the recently researched extensive Mesolithic open air site of Rottenburg Siebenlinden north of the Alps, where excavations lasted several months and resulted in a monograph publication of the site (Kind 2003). The German archaeologists found and analysed 138 or 99 microliths (Kind 2003, Tab. 32-33; Fig. 67, 69, 71-73), which are essentially bigger and also different from the microliths in Viktorjev spodmol, where there were 72 or 58 on an area 100 times smaller. Palaeontological finds without plant remains number 3,503 in the site Siebenlinden. Of this 2,105 were identified, and belonged to 11 species of large mammal, 3 species of small mammal, 4 species of bird, one species of fish and one species of shell (Kind 2003, 195ss, Tab. 81). In Viktorjev spodmol, on an area 100 times smaller, we found 23,984 remains of fauna. Of this, 6,076 were identified (without 58,000 osteoscutes of lizards), which belong to 14 species of large mammal, 30 species of small mammal, 13 species of cold blooded vertebrates and 47 species of mollusc. This is clear evidence that Viktorjev spodmol is a phenomenon, as other similar sites south of the Alps are phenomena. The biodiversity and luxuriance of life south of the Alps are not comparable with the impoverished world on the northern side of the Alps, at least not in the given case. It is therefore a great nonsense to interpret our finds with the aid of events of today's developed world on the other side of the Alps and not to rely on our own knowledge and our own rich sources, before others exploit them, so to speak, under our noses. I am firmly convinced that others could learn a good deal from us, rather than the reverse.

2. DEL / PART 2

MALA TRIGLAVCA

JANEZ DIRJEC
VASJA MIKUŽ
BORUT TOŠKAN
IVAN TURK
MATIJA TURK

1. Uvod

1. Introduction

Ivan Turk

M. Triglavca je izrazit spodmol v manjši vrtači na Divaškem krasu, ki ga je za arheološke potrebe prvi opisal in izmeril F. Leben (1988). Zato ga na tem mestu ne bom ponovno opisoval.

M. Triglavco je v letih 1979-1985 izkopaval F. Leben (1988), in je poleg V. Poharjeve (1990) in S. Petrujeve (1997) objavil edine primarne podatke o najdbah v njej. Na njegovo pobudo je I. Turk pozneje presejal in pregledal deponirane sedimente t. i. mezolitskega horizonta (Leben 1988, sl. 9). Ta je po Lebnovi terenski dokumentaciji vseboval vsaj 3 plasti (plasti 8-10 po oznakah iz leta 1981 oziroma plasti B1-B3 po oznakah iz leta 1983) v skupni debelini 1 m. V elaboratu iz l. 1983, ki ga hrani arhiv Inštituta za arheologijo ZRC SAZU (inv. št. 16), je F. Leben takole opisal mezolitski horizont: "Najnižji holocenski horizont predstavlja temnejša gruščnata in oglena do 1 meter debela plast (3,50-4,50 m) s sivimi pepelnatimi vložki in dvema vidnejšima ostankoma kurišč. Ta horizont je kulturno starejši od neolitskega, je brez keramičnih najdb, pač pa je v njem polno ostankov cervidne favne in rožena, koščena ter mikrolitska orodja (kopače sekirastih oblik, kladiva, tolkači, dleta)." Navedba v oklepaju se nanaša na orodja iz jelenovega rogovja in ne na mikrolite.

Sedimenti mezolitskih plasti niso bili nikoli natančneje opisani, je pa V. Pohar naredila analizo vzorcev, vzetih iz profila (neobjavljeno).

Ker o sedimentih z mezolitskimi najdbami ni bilo podatkov, smo samoinciativno vzorčili in pregledali 21 kg sedimenta iz domnevno nedotaknjene mezolitske plasti v dnu Lebnovega izkopa v zadnjem delu spodmola. Ugotovili smo, da v sedimentu prevladuje debel grušč z manjšimi bloki. Srednjega in drobnega grušča je malo. Drobnejši klasti so bodisi ostrorobi bodisi rahlo do močno zaobljeni. Veliko je kalcitnih konkrecij do velikosti grušča (med njimi tudi cevčice, ki nastanejo okoli koreninic) in odlomkov polžjih lupinic.

Ena od značilnosti vzorca sedimenta so sferični, kompaktni, zemljeni agregati do velikosti graha. Peščena frakcija je sestavljena skoraj izključno iz konkrecij. V njej ni agregatov, ostrorobi klasti pa so zelo redki.

Najdbe v vzorcu sedimenta predstavlja 8 večjih kamenih artefaktov in 9 mikro lusk, 16 majhnih fragmentov keramike, 321 nedoločljivih kostnih fragmentov,

M. Triglavca is a pronounced overhang in a small collapsed doline on the karst of Divača, which was first described and measured for archaeological purposes by F. Leben (1988). I will not therefore describe it again here.

F. Leben (1988) excavated M. Triglavca in 1979-1985, and apart from V. Pohar (1990) and S. Petru (1997), published the only primary data about finds in it. On Leben's initiative, I. Turk later wet sieved and examined the deposited sediment of the so-called Mesolithic horizon (Leben 1988, Fig. 9). According to Leben's field documentation, this contained at least three layers (layers 8-10 according to markings from 1981 or layers B1-B3 according to markings from 1983) to a total thickness of 1 m. In a report from 1983, which is kept in the archive of the Institute of Archaeology ZRC SAZU (inv. no. 16), F. Leben described the Mesolithic horizon as follows: "The lowest Holocene horizon presents a darker rubble and charred layer up to 1 m thick (3.50-4.50 m) with grey ashy deposit and two more visible remains of hearths. This horizon is culturally older than the Neolithic, is without pottery finds, but full of remains of deer fauna and antler, bone and microlithic tools (axe shaped diggers, hammers, pestles, burins)". The part in brackets relates to tools from deer horn and not to microliths.

The sediments of Mesolithic layers were never exactly described, but V. Pohar made an analysis of samples taken from the profile (unpublished).

Since there was no data on sediments with Mesolithic finds, on our own initiative we sampled and examined 21 kg of sediment from the suspected undisturbed Mesolithic layer on the floor of Leben's trench in the back part of the overhang. We found that coarse gravel predominated in the sediment, with smaller blocks. There was little medium or fine gravel. Smaller clasts were either sharp edged or lightly to strongly rounded. There were a lot of calcite concretions to the size to the gravel (including tubular concretions created around rootlets) and fragments of snail shells.

Spherical, compact, soil/earth aggregates up to the size of a pea are one of the characteristics of the sediment sample. The sand fraction consists almost exclusively of concretions. There are no aggregates in it, and sharp-edged clasts are very rare.

11 ostankov gozdnega jelena (*Cervus elaphus*), 4 ostanki svinje (*Sus scrofa*), 3 ostanki drobnice (*Ovis* s. *Capra*), 1 ostanek poljskega zajca (*Lepus europaeus*), ostanki sesalske mikrofavne (sivi hrček (*Cricetulus migratorius*), gozdna voluharica (*Clethrionomys glareolus*), navadni polh (*Glis glis*), belonoge miši (*Apodemus* sp.), ostanki herpetofavne (navadni slepec - *Anguis fragilis*, idr.) in ostanki malakofavne (kopenski polži in morske školjke).

Sedimenti v Lebnovi deponiji domnevno pripadajo mezolitski plasti. To potrjujejo tako najdbe Lebnovih izkopavanj kot najdbe ponovno pregledanega vzorca te deponije. Ponovno pregledani vzorec je zajel 1.677 kg sedimenta, kar je le manjši del deponije. Zato je Lebnova ekipa nehote spregledala veliko več mezolitskih najdb, kot jih tu objavljamo. Te so še vedno varno spravljene v deponiji, vse dokler bo zaščita arheološkega najdišča v M. Triglavci učinkovita. V nasprotnem primeru bo M. Triglavco doletela usoda številnih drugih podobnih najdišč v Evropi - izropanje in uničenje.

Splošen vtis o presejanem deponiranem sedimentu z značilnimi mezolitskimi najdbami je:

Prevladujejo grušč in manjši bloki, kar govori o izrazito skeletnem sedimentu. Grušč in bloki so vsi ostrorobi, površine niso preperele. Osnovo predstavlja v glavnem črna, v manjši meri tudi rdečerjava prst. V frakciji drobnega grušča močno prevladujejo ostrorobi klasti nad konkrecijami, kompaktnimi sferičnimi agregati, fragmenti polžjih lupinic in kostnim drobirjem. Kostnih drobcev, manjših od 3 mm, je malo.

Arheološke najdbe predstavljajo: kamniti artefakti (22.886 kosov ali 3,12 kg, od tega 348 orodij ali 0,22 kg), fragmenti keramike (280 kosov ali 0,82 kg), ožgani in kalcinirani kostni drobci (več tisoč kosov), okra (več sto koščkov), 34 preluknjanih hišic morskih polžev (pretežno golobice - *Columbella rustica*, eno koščeno šilo, ena fragmentirana koščena piščal, en fragmentiran cevast obroč in dve prevrtani mikro jagodi.

Paleoantropološke najdbe predstavlja en zgornji levi mlečni sekalec (glej Štamfelj *et al.* v tem zborniku).

Paleontološke najdbe predstavljajo: ostanki sesalske makrofavne (več deset tisoč nedoločljivih kostnih fragmentov in vsaj 566 določljivih kosov), sesalska mikrofavna (več tisoč nedoločljivih kosti in čez tisoč določljivih zob), redki ostanki ptic, ostanki herpetofavne (med drugim več sto dermalnih ploščic navadnega slepca), redki ostanki rib (vretenca, zobje in luske), ostanki kopenskih polžev (več tisoč poškodovanih hišic in zakrnelih ostankov hišic, od katerih jih je precej določljivih, in več sto tisoč nedoločljivih fragmentov hišic), ostanki školjk, tudi morskih (118 fragmentov lupin, pretežno klapavice (*Mytilus* sp.) drobci oglja in nepoškodovana semena (več sto različnih semen, tudi zoglenelih). Vse paleontološke najdbe je pobral in začasno razvrstil J. Dirjec.

Vse naštete najdbe na tem mestu ne bodo deležne

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Finds in the sample amount to 8 larger stone artefacts and 9 microflakes, 16 small fragments of pottery, 321 unidentified bone fragments, 11 remains of red deer (*Cervus elaphus*), 4 remains of wild boar (*Sus scrofa*), 3 remains of kine (*Ovis* s. *Capra*), 1 remain of hare (*Lepus europaeus*), remains of mammalian microfauna (grey hamster (*Cricetulus migratorius*), bank vole (*Clethrionomys glareolus*), dormouse (*Glis glis*), field mice (*Apodemus* sp.), remains of ectothermic vertebrates (slow worm - *Anguis fragilis*, etc.) and remains of malacofauna (land snails and sea shells).

The sediments in Leben's deposits presumably belong to the Mesolithic layer. This is confirmed both by the finds of Leben's excavations and the finds from the re-examination of a sample of the deposits. The re-examination of the sample included 1,677 kg of sediment, which is only a minor part of the deposits. So Leben's team unintentionally overlooked far more Mesolithic finds than are here published. These are still safely stored until the archaeological site in M. Triglavca is effectively protected. Otherwise, M. Triglavca will suffer the fate of numerous other similar sites in Europe - pillaged and destroyed.

The general impression of the sieved deposited sediments with typical Mesolithic finds is: Gravel and smaller blocks predominate, which testifies to explicitly skeletal sediment. The gravel and small blocks are all sharp-edged, and the surfaces are not weathered. The matrix component is for the most part black, to a lesser extent also red-brown soil. In the fraction of fine gravel, sharp-edged clasts greatly predominate above compact concretion, spherical aggregates, fragments of snail shells and small bits of bone. There are few bone fragments smaller than 3 mm.

Archaeological finds are: stone artefacts (22,886 items or 3.12 kg, of which 348 tools or 0.22 kg), fragments of pottery (280 items or 0.82 kg), charred and calcified bone fragments (more than 1000 items), ochre (more than 100 pieces), 34 perforated shells of sea molluscs (mainly gastropod - *Columbella rustica*, one bone awl, one fragmented bone flute, one fragmented tubular band and two drilled micro-beads.

Paleoanthropological finds are represented by one upper left milk molar (see Štamfelj *et al.* in this volume).

Paleontological finds are: remains of mammalian macrofauna (several tens of thousand of unidentifiable bone fragments and at least 566 identified items), mammalian microfauna (several thousand unidentified bones and more than one thousand identified teeth), a few remains of birds, remains of ectothermic vertebrates (including several hundred dermal plates - osteoscutes of slow worm), occasional remains of fish (vertebrae, teeth and scales), remains of land snails (several thousand damaged shells and atrophied shells of which a considerable number are identifiable and more than one sistematične obdelave na način, kot so ga bile deležne najdbe iz Viktorjevega spodmola, ker ne moremo kot posamezniki večkrat kršiti formalni program Inštituta za arheologijo in vseh formalnih programov ustanov in inštitutov zunanjih sodelavcev. Zato ponovno poudarjamo, da je bil obetavni projekt raziskav v Viktorjevem spodmolu (tedaj še Podjamci) zavrnjen zaradi prenizke uvrstitve v evalvacijskem postopku. Kar zadeva M. Triglavco, je bila in bo kot najdišče izčrpana in objavljena v drugih raziskovalnih programih, ki so zadostili standardom za uvrstitev na nacionalni seznam projektov. Ker tukajšnji avtorji nismo odgovorni za te formalno sprejete projekte, je naš prispevek zgolj rezultat dobre volje in dobre namere. Vsekakor pa bo stroka pridobila veliko več, ko bodo objavljeni izsledki projektov, katerih standardi glede na to, da so bili uvrščeni na nacionalni seznam projektov, visoko presegajo našo raven.

hundred thousand unidentified fragments of shells), remains of other molluscs, including seashells (118 fragments of shell, predominantly mussels (*Mytilus* sp.) fragments of charcoal and undamaged seeds (more than a hundred different seeds, including carbonised). All the paleontological finds were collected and provisionally classified by J. Dirjec.

All the enumerated finds will not be subject to systematic treatment as were finds from Viktorjev spodmol, since we cannot as individuals go too far outside the formal programme of the Institute of Archaeology and all the formal programmes of the foundations and institutes of external associates. So we stress again that the promising research project in Viktorjev spodmol (then still Podjamca) was rejected because of too few points in the evaluation procedure. M. Triglavca has been and will be drawn on and published as a site in other research programmes, which satisfy standards for inclusion in the national list of projects. Since the authors involved here are not responsible for these formally accepted projects, our contribution is only a result of good will and good intentions. Certainly the profession will obtain a great deal more when the results of projects are published whose standards, having been included in the national list of projects, can greatly exceed our means.

2. Arheološke najdbe

2. Archaeological Finds

Matija Turk & Ivan Turk

Inventar kamenih orodij, najdenih med izkopavanji, naj bi bil relativno skromen, zlasti v primerjavi s koščenimi izdelki. F. Leben (1988) je objavil 5 mezolitskih kamenih artefaktov in več koščenih orodij. D. Josipovič (1992, 52) navaja, da je neobjavljenih še nekaj desetin artefaktov, S. Petru (1997, 84s) pa govori o nekaj več kot 100 tipološko določljivih orodjih, med katerimi poimensko navaja praskala, trapeze, puščične konice, vbadala, mikro vbadala, svedre, kline z izjedo, odbitek z izjedo in odbitke s prečno retušo. V Lebnovem dnevniku izkopavanj, ki ga hrani Inštitut za arheologijo (arhivska št. A115), piše, da so zadnje leto izkopavanj presejali vse takrat odkopane mezolitske sedimente in sedimente, odkopane leto prej. Po navedbah v dnevniku so tako našli približno 750 odbitkov in najmanj 20 artefaktov, med njimi, sodeč po risbi, tudi odlomek konice z dvojnim hrbtom. Petrujeva navaja, da so v mezolitskih plasteh M. Triglavce našli približno 800 kosov litičnega inventarja. Vse najdbe še niso objavljene, zato ne bodo predmet tega zbornika, ki se ukvarja izključno z najdbami iz ponovno pregledanih sedimentov.

Ponovni pregled dela že pregledanih sedimentov je pokazal, da so bila kamena orodja očitno močno podcenjena, koščena pa posledično precenjena. O najdišču smo imeli zato napačno predstavo.

Ustreznejša slika, ki je sicer delna, vendar dovolj zanesljiva in verodostojna, je naslednja:

V presejanem delu sedimentov je bilo najdenih 22.886 kamenih artefaktov, od tega 22.538 odpadkov in 348 izdelkov. Skupna teža vseh kamenih artefaktov je 3,12 kg, od tega 2,90 kg odpadkov in 0,22 kg (natančneje 218,4 g) izdelkov. Izdelkov je samo 1,5 % (kosi) oziroma 6,9 % (teža). Če bi hotel dobiti popolno kvantitativno sliko Lebnovih izkopavanj, bi morala presejati ves sediment t. i. mezolitske plasti, kjer se nadejava še nekajkrat toliko najdb.

Izdelki in tehnološki primerki so zastopani, kot je prikazano v razpredelnici 2.1.

Med orodji močno prevladujejo (po vrstnem redu) trikotniki *sensu lato*, retuširani odbitki, trapezi, praskala in kline z izjedo.

Na odbitkih so vse vrste retuš, vendar močno prevladuje polstrma direktna retuša. Kar 6 retuširanih odbitkov je krakeliranih.

The inventory of stone tools found during the excavations was relatively modest, especially in comparison with bone products. F. Leben (1988) published 5 Mesolithic stone artefacts and a number of bone tools. D. Josipovič (1992, 52) states that several tens of artefacts remain unpublished, and S. Petru (1997, 84s) speaks of more than 100 typologically identified tools, including mentioning individually endscrapers, trapezes, arrow tips, burins, microburins, borers, notched blades, a notched flake and truncated flakes. In Leben's diary of the excavation, which is kept by the Institute of Archaeology (archive no. A115), he writes that in the last year of the excavation they sieved all the then excavated Mesolithic sediments and sediments excavated the previous year. According to statements in the diary, they thus found approximately 750 flakes and at least 20 artefacts, including, judging by the drawing, a fragment of a double-backed point. Petru states that in the Mesolithic layers of M. Triglavca they found approximately 800 items of lithic inventory. All the finds are not yet published, so they will not be the subject of this publication, which deals exclusively with finds from a re-examination of the sediments.

Re-examination of part the already examined sediments showed that stone tools had clearly been greatly underestimated, and bone ones consequently overestimated. We therefore had a very mistaken concept of the site.

A more appropriate picture, which although partial is sufficiently reliable and trustworthy is the following:

In the sieved part of the sediments, 22,886 stone artefacts were found, of which 22,538 were debris and 348 products. The total weight of all artefacts is 3.12 kg, of which 2.90 kg is debris and 0.22 kg (more precisely 218.4 g) products. Products make up only 1.5 % (pieces) or 6.9 % (weight). If we wished to obtain a complete quantitative picture of Leben's excavation, we would have to sieve all the sediments of the so-called Mesolithic layer, where we would hope for several times as many finds again.

Products and technological specimens are represented as shown in Table 2.1.

Among tools the following greatly predominate (in order): triangles *sensu lato*, retouched flakes, trapezes, endscrapers and notched blades.

There were all types of retouch on the flakes, alt-

Razpredelnica 2.1: Zastopanost izdelkov in nekaterih tehnoloških primerkov v pregledanem sedimentu M. Triglavce.
Table 2.1: Representation of products and some technological specimens in the re-examined sediment of M. Triglavca.

Vrsta izdelka Clasification of tools	Kosov Count	Teža (g)* Weight (g)*	g/kos g/piece	g maks. g max	g min. g min
Praskala / Endscraper	37	50,8	1,6	6,0	0,5
a) na odbitku / on flake	24	42,0	1,7	6,0	0,5
b) na klini / on blade	3	2,1	0,7	0,9	0,6
c) fragmenti / fragmented	5	6,7	1,3	1,6	0,7
Odbitki retuširani/ Retouched flakes	40	33,8	0,8	4,5	0,1
Kline retuširane / Retouched blades	19	8,4	0,4	1,9	0,1
Odbitki s prečno retušo / Truncated flakes	2	1,1	0,5	0,9	0,2
Kline s prečno retušo / Truncated blades	5	1,9	0,4	0,6	0,2
Odbitki z izjedo / Notched flakes	4	5,8	1,5	1,8	0,7
Kline z izjedo / Notched blades	35	17,8	0,5	2,8	0,1
Sveder (luknjač) / Borer (Perforator)	1	1,0	1,0	1,0	1,0
Strgala / Scrapers	2	8,9	4,5	5,7	3,2
Klinice retuširane / Retouched bladelets	15	0,8	0,05	<0,1	<0,1
Mikro konice / Micropoints	18	1,9	0,11	0,5	<0,1
Trikotniki / Triangles	45	4,3	0,09	0,3	<0,1
a) raznostranični / scalenes	40	3,7	0,09	0,2	<0,1
b) enakokraki / isoceles	5	0,6	0,12	0,3	<0,1
Mikroliti fragmenti / Microliths fragments	20	0,5	0,03	0,1	<0,1
Trapezi / Trapezes	39	13,1	0,3	0,9	0,1
?Trapezi fragmenti / ?Trapezes fragments	6	1,6	0,3	0,7	0,1
Mikro vbadala / Microburins	67	11,9	0,2	0,8	<0,1
Tehnični primerki / Technical pieces	82	-	-	-	-
a) odbitki z negativom bulbusa / flakes with negative bulb of percussion	31	5,8	0,2	0,7	<0,1
b) klin(ic)e z negativom bulbusa / blades and bladelets with negative bulb of percussion	31	8,1	0,3	1,1	<0,1
c) deli jeder / core fragments	20	37,8	1,9	9,8	0,3
SKUPAJ brez mikro vbadal in teh. prim. TOTAL without microburins and techn. pieces	286	151,7	-	-	-

*Teže so natančne ± 0,1g.
*Weight is accurate to ± 0,1g.
OPOMBA: Mikro vbadala in t.i. tehnični primerki dejansko sodijo med odpad.
NOTE: Microburins and technical pieces are in fact part of debris.

Kline so retuširane z direktno drobtinčasto, polstrmo in strmo retušo, običajno samo na enem robu. Samo v enem primeru imamo inverzno retušo. Med retuširanimi klinicami močno prevladuje strma retuša (hrbet) nad drugimi retušami. Med retuširanimi klinami in klinicami sta tudi dva krakelirana primerka. Vzorec fragmentarnosti se pri retuširanih klinah in klinicah bistveno razlikuje od vzorca fragmentarnosti neretuširanih klin in klinic, ki so služile kot nastavki za izdelavo različnih orodij. Vsi deli retuširanih klin in klinic so namreč enakomerneje zastopani (razpredelnica 2.2), kar povezujemo z naključnim (nenamenskim) fragmentiranjem.

Odbitki in kline s prečno retušo so običajno strmo retuširani. Krakeliranih primerkov ni.

Kline in odbitki z izjedo predstavljajo v skoraj polovici primerov ponesrečene poskuse lomljenja klin z mikrovbadalno tehniko. Namesto ob izjedi se je klina odlomila nekoliko nad njo. Med klinami in odbitki z izjedo je tudi 6 krakeliranih primerkov.

Mikro konice so razen pri redkih izjemah retušira-

hough semi-abrupt direct retouches greatly predominated. Six of the retouched flakes had been thermally treated.

The blades are retouched with direct marginal retouch, semi-abrupt and abrupt retouch, normally only on one edge. Only on one specimen is there an inverse retouch. Among retouched bladelets, backed bladelets greatly predominate over other types of retouching. Two of the retouched blades and bladelets have been thermally treated. The sample of fragmentation with the retouched blades and bladelets essentially differs from the sample of fragmentation of unretouched blades and bladelets, since they served as blanks for the production of various tools. All parts of retouched blades and bladelets, namely, are equally represented (Table 2.2), which we associate with coincidental (unintentional) fragmentation.

Flakes and blades are normally backed. There are no thermally cracked specimens.

Blades and flakes with notch in almost half of cases represent an unsuccessful attempt at fracturing a

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ne s strmo retušo na obeh robovih. Krakeliranih primerkov ni.

Trikotniki, h katerim prištevava tudi klinice s hrbtom in prečno retušo (*dos et troncatures*), so izdelani s pomočjo strme retuše, redkeje polstrme. Raznostranični trikotniki oz. hrbti in prečne retuše močno prevladujejo nad enakokrakimi trikotniki. Med raznostraničnimi trikotniki sta tudi dva krakelirana primerka. Večina trikotnikov ima odlomljeno bazo (razpredelnica 2.3). Podobno je v Viktorjevem spodmolu. Zato sklepava, da so bili trikotniki prilepljeni na leseno puščico s hrbtom tako, da je bila baza spredaj, kratka prečna retuša pa je delovala kot zobec pri harpuni. Bazalni deli so se pri zadetkih poškodovali, zato je bilo treba trikotnike večkrat zamenjati. To so lovci storili doma, kjer so izdelovali tudi nadomestne dele za vse vrste lovnih in drugih pripomočkov.

Trapezi so poleg trikotnikov in mikro konic najznačilnejši izdelki mezolitske kamene obrti. Razen redkih izjem so vsi izdelani s t. i. mikrovbadalno tehniko. Izraz uporabljava kljub njegovi neprimernosti, saj gre v bistvu za lomljenje klin ob izjedi z namenom dobiti trapezu podoben segment kline z ostrim trnom (*piquant-trièdre*), ki je domnevno služil kot ost puščice. Nekatere osnovne značilnosti trapezov so prikazane v razpredelnici 2.4. Med trapezi je tudi 5 krakeliranih primerkov.

Struktura odpada je prikazana v razpredelnicah 2.5–2.9. Kot običajno močno prevladujejo mikro odpadki (odpadki, manjši od 3 mm). Med jedri so najpogostejša neizoblikovana in enopolarna jedra. Ta so največja. Druga jedra (piramidalna, prizmatična in navzkrižna) so bistveno manjša. Med preostalim odpadom prevladujejo neretuširani odbitki in razbitine prodnikov. Neretuširanih klin in klinic je relativno malo. Razbitine s korteksom in neretuširani odbitki s korteksom so praviloma precej večji od razbitin in navadnih neretuširanih odbitkov brez korteksa. Razlika v velikosti bi bila lahko tehnološko pogojena. Takšne razlike ni pri neretuširanih klinah in klinicah, med katerimi je izredno malo celih primerkov. Domnevava, da so bile neretuširane kline in

blade using a microburin technique. Instead of fracturing at the notch, the blade broke slightly above it. Among bladelets and flakes with notch there are also 6 thermally cracked specimens.

Micropoints, with rare exceptions, are retouched with an abrupt retouch on both edges. There are no thermally cracked specimens.

Triangles, in which we also include truncated backed bladelets (*dos et troncatures*), are made with the aid of an abrupt retouch, rarely a semi-abrupt one. Scalene triangles or truncated backed bladelets greatly predominate over isosceles triangles. There are two thermally cracked specimens among the scalene triangles. Most of the triangles have a fractured base (Table 2.3). It is similar in Viktorjev spodmol. We therefore conclude that the triangles were attached to a wooden arrow by the back so that the base was to the fore, and the short truncation operated like the barb on a harpoon. The basal parts were damaged when they struck, so the triangle had to be replaced several times. The hunters did this at home, where they also made spare parts for all kinds of hunting and other accessories.

Together with triangles and micropoints, trapezes were the most characteristic product of Mesolithic stone flaking. With few exceptions, they are all produced with the microburin technique. We use the term despite its unsuitability, since they are essentially broken blades with a notch in order to get a segment of the blade with a sharp trihedral point (*piquant-trièdre*), which presumably served as the arrow tip. Some basic characteristics of trapezes are shown in Table 2.4. Five of the trapezes are thermally cracked.

The structure of debris is shown in Tables 2.5–2.9. As is usual, micro debris (debris smaller than 3 mm) greatly predominates. Unformed and unidirectional cores are the most frequent of the cores. They are the largest. Other cores (pyramidal, prismatic and cores with crossed blank removals) are essentially smaller. Among other debris, unretouched flakes and shatter fragments of pebbles predominate. There are relatively few unre-

Razpredelnica 2.2: Specifikacija retuširanih klin in klinic v pregledanem sedimentu M. Triglavce.
Table 2.2: Specification of retouched blades and bladelets in the re-examined sediment from M. Triglavca.

Kline Klinice Blades Bladelets	**Cela Complete**	**Baza Basal**	**Pecelj Stem**	**Sredina Medial**	**Konec Terminal**	**Hrbet Backed**	**Hrbet in drobtinčasta retuša Backed and marginal retouch**	**Drobtinčasta retuša unilateralna Marginal retouch unilateral**	**Drobtinčasta retuša bilateralna Marginal retouch bilateral**
Kline Blades	0	6*	2	8	3	4	2	2	0
Klinice Bladelets	3	4	1	4	3	8	4	0	2
SKUPAJ TOTAL	3	10	3	12	6	12	6	2	2

* Trije bazalni deli klin predstavljajo kline, ki jim je bil dejansko odlomljen samo konec.
* Three basal parts of blades in fact represent the blades which were only terminally broken.

klinice namenoma polomljene (segmentirane), sredine in konci, ki jih je najmanj, pa uporabljeni kot nastavki za izdelavo različnih orodij (npr. trikotnikov). Podobno stanje poznamo tudi iz Viktorjevega spodmola in verjetno marsikaterega mezolitskega najdišča. Zato ni to nič neobičajnega. V nobenem primeru pa ne gre za naravno lomljenje klin in klinic, saj bi drugače ne bilo takšnih nesorazmerij med zastopanostjo bazalnih in drugih njihovih delov. Med segmentiranimi klinami in klinicami je skoraj desetina krakeliranih.

Med odpad sodijo tudi mikro vbadala. Nastavki za izdelovanje orodij, katerih odpadek so t. i. mikro vbadala, so bile skoraj izključno kline. Od 81 mikro vbadal je samo 9 primerkov s korteksom in 6 krakeliranih. Relativno veliko število mikro vbadal omogoča njihovo strukturiranje, ki je prikazano v razpredelnici 2.9. Močna prevlada delov baze in konca kline nad njenim sredinskim delom kaže, da so bili ti deli klin uporabljeni kot končni nastavki za izdelke. V danem primeru so bili to predvsem trapezi s trirobim trnom (*piquant-trièdre*) na daljši prečno retuširani stranici. Usmerjenost mikro vbadal je podobna usmerjenosti daljše stranice trapezov s prečno retušo. V obeh primerih namreč močno prevladujejo levi primerki, kar je lahko povezano z delno standardizacijo postopka izdelave trapezov na že opisani način.

Tehnologija:

Tehnološki postopki, uporabljeni pri obdelavi surovine, so bili podobni, kot smo jih ugotovili v Viktorjevem spodmolu. Številni krakelirani odpadki (med njimi tudi eno jedro) in izdelki kažejo, da je bila surovina toplotno obdelana pred odbijanjem in retuširanjem. Velike razlike v velikosti razbitin in odbitkov s korteksom in brez njega kažejo, da so bile pri izkoriščanju jeder uporabljene različne tehnike, vsaka z določenim namenom. Najbolj izpopolnjena tehnika je bila tista, s katero se dobijo kot papir tanki odbitki in kline (glej I. Turk in M. Turk, ta zbornik). Zanje je značilen talon v obliki zelo sploščene krivulje normalne porazdelitve in poleg bulbusa še

touched blades and bladelets. Shatter fragments with cortex and unretouched flakes with cortex are generally considerable bigger than shatter fragments and ordinary unretouched flakes without cortex. Differences in size may have been technologically conditioned. There are not such differences with unretouched blades and bladelets, among which there are exceptionally few whole specimens. We suspect that the unretouched blades and bladelets were deliberately broken (segmented), and the centres and ends, of which there are the least, used as blanks for making various tools (e.g., triangles). We recognise a similar state also from Viktorjev spodmol and probably many other Mesolithic sites. So that is nothing unusual. In no case are blades and bladelets naturally broken, since otherwise there would not be such disproportion in the representation of proximal and other parts. Almost a tenth of the segmented blades and bladelets had been thermally cracked.

Microburins are included in the debris. Blanks for making tools were almost exclusively blades. Of 81 microburins, there were only 9 specimens with cortex and six thermally cracked. The relatively large number of microburins enables their structure to be shown, which is done in Table 2.9. The strong prevalence of proximal and distal parts of blades over their medial part shows that these parts of the blades were used as final blanks for products. In the given case they were mainly trapezes with trihedral point on the longer truncated side. The orientation of the microburins is similar to that of the longer truncated side of trapezes. In both cases, left-handed specimens predominate, which could be connected with partial standardisation of the procedure of production of trapezes in the already described manner.

Technology:

The technological procedures used in the working of raw materials were similar to those found in Viktorjev spodmol. Considerable thermally cracked debris (inclu-

Razpredelnica 2.3: Specifikacija trikotnikov v pregledanem sedimentu M. Triglavce.
Table 2.3: Specification of triangles in the re-examined sediment from M. Triglavca.

<table>
<tr><th>Trikotniki
Triangles</th><th>Cel
Complete</th><th>Baza
Basal</th><th>Sredina
Medial</th><th>Konec
Terminal</th><th>Hrbet in drobtinčasta retuša*
Backed and marginal retouch*</th><th>Hrbet in strma retuša*
Double-backed*</th></tr>
<tr><td>Enakokraki
Isoceles</td><td>5</td><td>0</td><td>0</td><td>0</td><td>3</td><td>1</td></tr>
<tr><td rowspan="2">Raznostranični
Scalenes</td><td rowspan="2">12</td><td colspan="2">3</td><td>3</td><td rowspan="2">13</td><td rowspan="2">1</td></tr>
<tr><td></td><td colspan="2">22</td></tr>
<tr><td>SKUPAJ
TOTAL</td><td>17</td><td colspan="3">28</td><td>16</td><td>2</td></tr>
</table>

* Mišljena je retuša na najdaljši stranici trikotnika, ki običajno ni retuširana.
* Marginal and other retouch is mostly on longest side of triangle, which remains usually unretouched.

kontra-bulbus (t. 19: 257). Takšne kline so bile pogosto segmentirane in so domnevno služile za izdelavo različnih geometričnih hipermikrolitov. Sodeč po bazalnih delih mikro vbadal so bili nastavki za trapeze samo izjemoma pridobljeni s to tehniko. Skoraj vsi bazalni deli mikro vbadal so masivni in imajo velik talon, kar lahko pomeni, da so trapeze (projektile?) namenoma izdelovali na debelejših klinah, ki so jih dobili z direktnim odbijanjem. Debelejši projektili so trpežnejši od tankih in imajo zaradi večje mase tudi boljše balistične lastnosti.

Segmentiranje klin je potekalo na dva načina: z običajnim lomljenjem na upogib in z manj običajnim lomljenjem s pomočjo izjede. Posledica lomljenja na upogib so gladke, ravne prelomne ploskve z zavihkom. Rezultat lomljenja s pomočjo izjede so mikro vbadala in trapezi s trirobim trnom. Kaže, da je bil glavni namen lomljenja s pomočjo izjede, dobiti oster trn na daljši prečno retuširani stranici trapeza, ki se je domnevno uporabljal kot ost puščice. Izjeda je bila narejena bodisi z nizom retuš (običajno strmih) bodisi s klektonsko retušo. Zadnjo smo našli samo v štirih primerih. Obe tehniki sta se uporabljali tudi pri segmentiranju klinic, kar dokazujejo najdbe pigmejskih mikro vbadal.

Velika redkost so kline, ki imajo izjedo na talonu ali izrobo lateralno tik nad talonom (t. 18: 184). Izjeda (klektonska) na talonu je samo na enem od pravokotniških trapezov. Izjed tik nad talonom ni. V tem se M. Triglavca razlikuje od Viktorjevega spodmola, kjer so izjede na talonu in tik nad talonom pogostejše.

Surovina:

Splošno vzeto je surovinski sestav vseh kamnitih najdb zelo pester, saj so med njimi zastopani različni materiali in barve.

Surovina so bili izključno roženčevi, tufski in drugi prodniki, lokalnega izvora. Samo en ali dva trapeza in ena klina (t. 12: 45; 13: 82; 17: 149) so nedvomno izdelani iz 'uvoženih' surovin, vendar med njimi ni belo patiniranega sileksa. Kamena strela kot surovina ni prisotna. Za določene izdelke se niso izbirale posebne surovine.

ding one core) and products show that the raw material was thermally treated before segmenting and retouching. The large differences in the sizes of shatter fragments and flakes with cortex and without it, show that various techniques were used in the exploitation of cores, each for a specific purpose. The most complete technique was that by which they obtained paper thin flakes and blades (see I. Turk and M. Turk, this volume). A *chapeau de gendarme* platform is characteristic of it and in addition to a bulb of percussion also a negative bulb (Plate 19: 257). Such blades were often segmented and presumably served for the production of various geometric hypermicroliths. Judging by the proximal parts of the microburins, blanks for trapezes were only exceptionally obtained with this technique. Almost all the proximal parts of the microburins are solid and have a large platform, which could mean that trapezes (projectiles?) were deliberately produced on thicker blades, which they obtained with direct percussion. Thicker projectiles are more resistant that thin ones and because of the larger weight also have better balistic properties.

Segmenting blades was done in two ways: with a normal bending fracture and with less normal fracturing with the aid of a notch. The results of bending fractures are smooth, level fractures faces with *revers*. The results of fracturing with the aid of a notch are microburins and trapezes with trihedral point. It appears that the main purpose of fracturing with the aid of a notch is to get a sharp spike on the longer truncated side of the trapeze, which was presumably used as a the arrow tip. The notch was made either with a series of retouches (normal abrubt) or with a Clacton retouch. We only found the latter in four specimens. Both techniques were also used in segmenting bladelets, as 'pigmy' microburins demonstrate.

Blades that have a notch on the faceted platform or shoulder laterally immediately above it (Plate 18: 184) are a rarity. There is a notch (Clacton) on the faceted platform only on one rectangular trapeze. There is no notch immediately above the faceted platform. M. Triglavca, where there are notches on the facted platform and immediately above it fairly infrequently, differs in this from Viktorjev spodmol.

Razpredelnica 2.4: Specifikacija trapezov v pregledanem sedimentu M. Triglavce.
Table 2.4: Specification of trapezes in the re-examined sediment from M. Triglavca.

Oblika – tip (po G.E.E.M. 1969) Form – Type (after G.E.E.M. 1969)	Kosov Count	Levi Left	Desni Right	Kratki Short	Dolgi Elongated	Prečna retuša Truncation	
						majhna small	velika large
Simetrični / Symmetric	6	2	4	4	2	0	0
Asimetrični / Asymmetric	23	18	5	4	19	0	0
Pravokotniški / Rectangular	9	8	1	6	3	0	0
Rombasti / Rhombic	1	1	0	1	0	0	0
?Fragmenti / ?Fragmented	6	0	0	0	0	4	2
SKUPAJ brez fragm. TOTAL without fragments	39	29	10	15	24	0	0

Kar zadeva surovino in preskrbo z njo, ni bistvene razlike med M. Triglavco in Viktorjevim spodmolom kot verjetno tudi ne s Pod Črmukljo, je pa precejšnja razlika med skupino omenjenih najdišč in Bregom, kjer je med izdelki precej belo patiniranega sileksa. Njegova najbližja nahajališča so v naplavinah Nadiže (ustni podatek italijanskih kolegov).

Jedra (t. 8-9):

Jedra, predvsem večja so bila delno pobrana že med izkopavanji F. Lebna. Zato so njihove najdbe iz pregledanega sedimenta samo delno reprezentativne.

Jedra so relativno majhna, prilagojena velikosti surovine, tj. prodnikov. Samih prodnikov ni, je pa veliko njihovih razbitin, med njimi je malo večjih in veliko majhnih kosov (razpredelnica 2.7). Kljub umetni selekciji so prisotne vse faze izrabe jeder, od predhodnega jedra (prenukleusa) (t. 8: 278) do popolnoma izrabljenih jeder in različnih odbitkov, ki so nastali pri njihovem popravljanju. Veliko je tudi odbitkov s korteksom (razpredelnica 2.7). Vse to kaže na obstoj 'kamnoseških' delavnic v samem spodmolu, podobno kot v Viktorjevem spodmolu. Takšne delavnice dodatno podpira velika količina kamnitih odpadkov vseh velikosti.

Med jedri močno prevladujejo neizoblikovana in enopolarna, ki so povprečno enkrat večja od drugih oblik jeder (razpredelnica 2.6). Negativi klin so vidni samo na 9 enopolarnih jedrih (t. 8: 265-266; 9: 267-268). Od drugih enopolarnih in vseh neizoblikovanih jeder so bili odbiti samo odbitki. Med neizoblikovanimi jedri je tudi nekaj povsem izrabljenih majhnih jeder.

Številčno približno izenačena so prizmatična (t. 9: 274), piramidalna (t. 9: 269-272) in navzkrižna jedra (t. 8: 277; 9: 275-276). Med temi je več takih, od katerih so bile odbite kline in klinice. Nekaj piramidalnih jeder je prav miniaturnih (t. 9: 270-272).

Kljub velikemu številu jeder je videti, kot da bi bila ta v M. Triglavci tipološko siromašnejša od tstih v Viktorjevem spodmolu. Tako ni kroglastih in diskastih jeder ter jeder na odbitku. Tudi odbijanje z roba namesto z udarne ploskve dejansko ni znano. Pač pa je eno jedro

Raw materials:

Generally speaking, the raw material composition of all stone finds is very varied, with various materials and colours represented among them.

Raw materials are exclusively chert, tuff and other pebbles of local origin. Only one or two trapezes and one blade (Plates 12: 45; 13: 82; 17: 149) are undoubtedly produced from "imported" raw materials, although there was no white patinated flint among them. Rock crystal is not present as a raw material among them. They did not choose particular raw materials for specific products.

As far as raw materials and their supply are concerned, there is no essential difference between M. Triglavca and Viktorjev spodmol, nor probably Pod Črmuklja, but there is a more considerable difference between the aforementioned group of sites and Breg, where there is considerable white patinated chert/flint among the products. Its nearest origins are in the alluvium deposits of the Nadiža - *Natisone* (oral data from Italian colleagues).

Cores (Plates 8-9):

Cores, above all larger ones, were already partially collected during the excavations of F. Leben. So the finds from the re-examined sediment are only partially representative.

Cores are relatively small, adapted to the size of the raw material, i.e., pebbles. There are no pebbles as such, but there are a great many shatter fragments from them, a few big ones and lots of small pieces (Table 2.7). Despite the artificial selection, all phases of use of cores are present, from provisional cores (prenucleuses) (Plate 8: 278) to completely exhausted cores and various flakes created during their repair. There are also a lot of cortical flakes (Table 2.7). All this indicates the existence of a "masonry workshop" in the overhang itself, as at Viktorjev spodmol. The idea of such workshops is additionally supported by the large amount of stone debris of all sizes.

Unshaped and unidirectional cores greatly predominate among the cores, which are on average twice the

Razpredelnica 2.5: Struktura odpada v pregledanem sedimentu M. Triglavce.
Table 2.5: Structure of debris in the re-examined sediment from M. Triglavca.

Vsi odpadki All debris	Kosov Count	Teža (g) Weight (g)	g/kos g/piece	g maks. g max	g min. g min
<3 mm (mikro) / <3 mm (micro)	16640	56,4	0,003	<0,01	<0,01
>3 mm (makro) / >3 mm (macro)	3969	858	0,5	9,8	<0,1
Razbitine prodnikov >3 mm / Shattered pebbles > 3 mm	1155	1045,2	0,9	48,1	0,1
Jedra >3 mm / Cores > 3 mm	73	754,8	10,3	49,4	0,5
SKUPAJ / TOTAL	21837	2714,4	-	-	-

OPOMBA: Med odpadke so vključeni vsi tehnični primerki in mikro vbadala v razpredelnici 2.1.
NOTE: Debris includes all technical pieces and microburins from Table 2.1.

in vsaj 5 razbitin prodnikov krakeliranih na kortikalni strani, kar priča o termični obdelavi prodnikov in jeder. Iz nekaterih razbitin prodnikov in ostankov jeder so bila narejena preprosta strgala (t. 19: 222-223). Česa podobnega v Viktorjevem spodmolu nismo ugotovili.

Ker je med različnimi razbitinami prodnikov veliko zelo slabega kremena, ki je bil nedvomno takoj zavržen, so morali prebivalci M. Triglavce nositi v spodmol cele prodnike, ne da bi jih pred tem preizkusili ali naredili iz njih predhodna jedra. To je bilo mogoče, ker prodniki niso bili veliki, nahajališča pa so bila v bližini, se pa vsekakor ni splačalo, če sodimo po količini zavrženih prodnikov takoj po testiranju.

Neretuširane kline in klinice (t. 18: 243-249; 19: 250-256)

Zanje velja podobno, kot sva že ugotovila v Viktorjevem spodmolu. Medtem ko so laminarni odbitki večinoma celi, je večina klin in klinic fragmentiranih oz. segmentiranih. Med fragmenti močno prevladujejo bazalni deli (razpredelnica 2.8). To je vzorec, ki ga poznamo tudi v Viktorjevem spodmolu in ki potrjuje domnevo, da so bile neretuširane kline in klinice namenoma lomljene.

Udarne ploskve so gladke ali fasetirane in običajno majhne. Posebnost so zelo tanke kline s kontra-bulbusom in gladkim talonom, ki pa so vse fragmentirane oz. segmentirane. Te kline, ki niso pogoste, bi lahko primerjali s klinami, odbitimi na način Montbani, ki so značilne za končni tardenoazjen (*Tardenoisien final*) v Franciji (Rozoy 1979a, 370, sl. 2).

Glede na veliko število bazalnih in drugih delov bi pričakovala več izdelkov, narejenih iz nastavkov klin in klinic, kot jih je bilo dejansko najdenih. Zato domnevava, da vsi izdelki niso ostali v najdišču.

"Mikro vbadala" (t. 14: 170-171, 258-264, 284-283, 296):

Mikro vbadal je toliko, da je možno narediti nekatere sklepe. O tem, da gre za odpadek, ne dvomiva, za razliko od predhodnih raziskovalcev, ki se z vprašanjem, ali

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size of other forms of core (Table 2.6). Blade scars are visible on only 9 unidirectional cores (Plates 8: 265-266; 9: 267-268). Only flakes had been removed from the other unidirectional and all the unshaped cores. Among the unshaped cores there are also some completely exhausted small cores.

Prismatic (Plate 9: 274) and pyramidal cores (Plate 9: 269-272) and cores with crossed blank removals (Plates 8: 277; 9: 275-276) were in roughly equal numbers. A number of them had had blades and bladelets removed. Some of the pyramidal cores are real miniatures (Plate 9: 270-272).

Despite the large number of cores, it can be seen that those in M. Triglavca are typologically impoverished in comparison with those from Viktorjev spodmol. There are thus no spherical or disc cores or flake cores. Even striking with the edge instead of a striking platform is actually unknown. However, one of the cores and at least 5 shatter fragments of pebbles are thermally cracked on the cortical side, which testifies to the thermal treatment of pebbles and cores. Simple scrapers had been made from some shatter fragments and remains of cores (Plate 19: 222-223). We did not find anything similar in Viktorjev spodmol.

Since among the various shatter fragments of pebbles there was a lot of very bad chert, which was undoubtedly rejected immediately, the inhabitants of M. Triglavca must have carried pebbles to the overhang without previously testing them or making prenuclei from them. This was possible because the pebbles were not large, and they were found in the vicinity, but certainly did not pay judging by the amount of pebbles rejected immediately after testing.

Unretouched blades and bladelets (Plates 18: 243-249; 19: 250-256)

Similar applies for them as we established in Viktorjev spodmol. While laminar flakes are for the most part whole, the majority of blades and bladelets are fragmented or segmented. Among fragments, proximal parts greatly predominate (Table 2.8). This is a pattern that we also recognise in Viktorjev spodmol and which con-

Razpredelnica 2.6: Struktura jeder v pregledanem sedimentu M. Triglavce.
Table 2.6: Structure of cores in the re-examined sediment from M. Triglavca.

Vrsta jedra Core type	Kosov Count	Teža (g) Weight (g)	g/kos g/piece	g maks. g max	g min. g min
Neizoblikovana / Amorphous	34	387,6	11,4	46,8	1,4
Enopolarna / Unidirectional	20	249,6	12,5	49,4	2,0
Piramidalna / Pyramidal	6	20,1	3,4	10,4	0,5
Prizmatična / Prysmatic	6	36,7	6,1	10,0	3,6
Navzkrižna / With crossed blank removals	7	60,8	8,7	14,6	1,8
SKUPAJ / TOTAL	73	754,8	-	-	-

gre za orodje (vbadalo) ali odpadek, niso ukvarjali (npr. Brodar 1992, 26). Velika večina mikro vbadal je namreč popolnoma nepoškodovana, to pa pomeni, da niso bila uporabljena. Med trapezi, ki so nedvomno izdelki, je tretjina (14 kosov) takih, ki imajo odlomljeno konico trirobega trna. Tem je treba dodati še 9 različnih fragmentov, ki domnevno pripadajo trapezom. Med mikro vbadali ni fragmentov, so samo poškodbe vbadalnega roba. To lahko pomeni, da so bila vsaj nekatera uporabljena (primerjaj Petru 1997, 85).

Mikro vbadala se delijo na bazalna (t. 14: 259, 264), sredinska (t. 14: 283-284) in končna (t. 14: 258, 260-263), tj. glede na to, na katerem delu kline so. Nadalje se lahko delijo na leva (t. 14: 262, 264) in desna, tj. glede na to, na kateri strani kline je bila narejena izjeda.

Izjede so bile praviloma narejene z direktno strmo retušo. V redkih primerih je na mikro vbadalih klektonska izjeda (t. 14: 259). Ugotovila sva, da prevladujejo bazalna oz. končna in desna (v smislu delitve trapezov so to leva) vbadala (razpredelnica 2.9). Ugotovitev je skladna s potencialno dolžino klin in desničarstvom. Namreč: zaradi majhnih prodnikov večina klin ni bila daljša od dveh, treh centimetrov. Zato so jih lahko lomili samo enkrat s pomočjo izjede in večkrat brez nje. Izjedo desničarji podzavestno naredijo na desni hrbtni strani ne glede na to, kako je klina usmerjena glede na bazo in konec. Kaže, da so tako domnevni desničarji kot levičarji približno enako obračali kline enkrat z bazo proti sebi, drugič z bazo od sebe. Domnevnih desničarjev je bilo samo enkrat toliko kot levičarjev, kar je vsekakor zanimiva ugotovitev. Pojav domnevnega desničarstva in levičarstva ima tudi svoje geografske razsežnosti (Löhr 1994), ki so lahko pogojene z različnimi vplivi družbenega okolja v času in prostoru.

Sredinska mikro vbadala so skrajno redka in vedno v kombinaciji z navadnim prelomom, ki je bil posledica upogiba. To kaže, da so bile nekatere kline, ki so služile kot nastavki za trapeze, predhodno segmentirane. S segmentiranjem je bila odstranjena baza (ali

firms the suspicion that unretouched blades and bladelets were deliberately segmented.

The striking platforms are smooth or faceted and normally small. A particularity is very thin blades with a negative bulb and smooth plane, but which are all fragmented or segmented. These blades, which are not frequent, could be compared with blades removed by the Montbani method, which are typical of the *Tardenoisien final* in France (Rozoy 1979a, 370, Fig. 2).

In view of the large number of proximal and other parts, we would expect more products made from blanks of blades and bladelets than were actually found. It must be assumed that all products did not remain at the site.

"Microburins" (Plate 14: 170-171, 258-264, 284-283, 296):

There are sufficient microburins to reach some conclusions. We do not doubt that these are debris, in contrast to previous researchers who did not deal with the question of whether they are tools (burins) or debris (e.g. Brodar 1992, 26). The large majority of microburins, namely, are completely undamaged, which means that they were unused. Among trapezes that are undoubtedly products, a third (14 pieces) have a broken tip of the trihedral point. To these must be added a further 9 various fragments which presumably belong to trapezes. There are no fragments among the microburins, there is only damage to the burin edge. This could mean that at least some were used (see also Petru 1997, 85).

Microburins are divided into proximal (Plate 14: 259, 264), medial (Plate 14: 283-284) and distal (Plate 14: 258, 260-263), i.e., in relation to which part of the blade they are. They are further divided into left (Plate 14: 262, 264) and right, i.e., in relation to the side of the blade on which the notch was made.

Notches were normally made with a direct abrupt retouch. In a few specimens a Clacton notch had been

Razpredelnica 2.7: Struktura odpada > 3 mm (brez delov jeder) in razbitin prodnikov v pregledanem sedimentu M. Triglavce.
Table 2.7: Structure of debris > 3 mm (without parts of cores) and shatter fragments of pebbles in the re-examined sediment from M. Triglavca.

Vrsta odpada Debris		Kosov Count	Teža (g) Weight (g)	g/kos g/piece	g maks. g max	g min. g min
Razbitine prodnikov Shattered pebbles	s korteksom / with cortex	474	721,2	1,52	48,1	< 0,1
	brez korteksa / without cortex	681	324,0	0,47	6,8	< 0,1
Odbitki Flakes	s korteksom / with cortex	708	302,6	0,43	6,4	< 0,1
	brez korteksa / without cortex	2439	254,2	0,10	9,8	< 0,1
Odbitki laminarni Laminar flakes	s korteksom / with cortex	53	48,2	0,90	2,4	< 0,1
	brez korteksa / without cortex	26	9,9	0,38	1,5	< 0,1
Kline neretuširane Unretouched blades	s korteksom / with cortex	160	153,1	0,96	2,7	< 0,1
	brez korteksa / without cortex	381	355,6	0,93	2,2	< 0,1
Klinice neretuširane Unretouched bladelets	s korteksom / with cortex	14	0,7	0,05	< 0,1	< 0,1
SKUPAJ / TOTAL		5007	2172,6	-	-	-

konec?) kline, na prelomu pa so pozneje izdelali krajšo prečno retušo trapeza. Skladno s takšno razlago je veliko število bazalnih odlomkov neretuširanih klin (razpredelnica 2.8).

V zvezi z velikostjo mikro vbadal sva ugotovila, da prevladujejo zelo majhni primerki, med katerimi so tudi pigmejska mikro vbadala. Nadalje sva ugotovila, da je mikro vbadal (odpada) premalo v primerjavi s trapezi (izdelki). Razmerje mikro vbadala / trapezi je v M. Triglavci 1,5 v Pečini na Leskovcu (*Grotta Azzurra*) 13,5 in v *Riparo Gaban* 18,6 (glej I Turk, ta zbornik, razpredelnica 8.2 in 8.3). Poleg tega nama ni uspelo sestaviti niti enega mikro vbadala in trapeza. To pomeni, da je bilo izdelanih veliko trapezov, ki se niso nikoli vrnili na najdišče ali, da je veliko mikro vbadal zapustilo najdišče. Slednje se nama zdi manj verjetno kot prvo. Namreč: o trapezih lahko domnevamo, da so končali kot osti puščic. Zato je smiselno, da se mnogi niso vrnili v najdišče, tj. bazno taborišče. Za mikro vbadala ni razlage, čemu bi služila zunaj najdišča. Če bi se dejansko uporabljala kot vbadala (dletca in/ali perforatorji), bi z njimi delali predvsem v najdišču, tj. doma, ne pa na lovno-nabiralnih pohodih. Sploh so t. i. vbadala zelo dvomljivo orodje in so v mezolitiku nepomembna.

Vbadala:

V novo pridobljenem gradivu M. Triglavce ni vbadal, razen enega diedričnega. V množici neretuširanih odbitkov tudi ni t. i. vbadalnih odbitkov, razen morda dveh, treh.

Izjede in zobci (t. 14: 164-169, 172-177, 179; 16: 118; 17: 149-153; 18: 154-163):

V M. Triglavci so samo izjede brez zobcev. Te so bile narejene predvsem na klinah oz. klinicah (t. 14: 164-169, 172-175; 16: 118; 17: 149, 150-153; 18: 154-163,) in samo izjemoma na odbitkih (t. 14: 176, 177, 179). To dejstvo skupaj z velikim številom prelomov tik nad izjedo ali pod njo (t. 14: 164-169, 172-174; 17: 152) kaže na

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made on microburins (Plate 14: 259). We ascertained that proximal and distal and right (in terms of division of a trapeze these are left) microburins predominated (Table 2.9). The finding is in accordance with the potential lengths of blades and righthandedness. In other words, because the pebbles were small, the majority of blades were not longer than two or three centimetres. So they could be fractured only once with the aid of a notch, or more times without it. Righthanders subconsciously make a notch on the right side, irrespective of how the blade is oriented in relation to the bulbar end and tip. It appears that both the suspected righthanders and left handers turned the blade roughly the same once with the bulbar end towards them and once with it away from them. There were only twice as many righthanders as lefthanders, which is at least an interesting finding. The phenomenon of the suspected righthanders and lefthanders also has a geographic aspect (Löhr 1994), which may have been conditioned by various influences of the social environment in time and space.

Medial microburins are extremely rare and always in combination with a snap fracture, which was a result of flex. This shows that some blades that served as blanks for trapezes, had been previously segmented. With segmenting, the bulbar end (or distal end) of the blade was removed and a shorter truncation of trapeze subsequently produced on the fracture. The large number of proximal fragments of unretouched blades accords with such an explanation (Table 2.8).

We found that very small specimens of microburins predominated, including pygmy microburins. We further ascertained that the number of microburins (debris) was too small in comparison with the trapezes (products). The ratio microburins/trapezes in M. Triglava is 1.5, in Pečina na Leskovcu (*Grotta Azzurra*) 13.5 and in *Riparo Gaban* 18.6 (see I Turk, this volume, Table 8.2 in 8.3). In addition, we did not succeed in refitting even one microburin and trapeze. This means that a great many trapezes were made that never returned to the site, or that a great many microburins were removed from the site. The latter seems less likely than the former. Trapezes presumably ended up as arrowheads. It is understan-

Razpredelnica 2.8: Struktura neretuširanih klin in klinic v pregledanem sedimentu M. Triglavce.
Table 2.8: Structure of unretouched blades and bladelets in the re-examined sediment from M. Triglavca.

Kline klinice Blades bladelets	Neretuširane kline (kosov) Unretouched blades (count)					Neretuširane klinice (kosov) Unretouched bladelets (count)				
	Cela Complete	Baza Basal	Sredina Medial	Konec Terminal	SKUPAJ TOTAL	Cela Complete	Baza Basal	Sredina Medial	Konec Terminal	SKUPAJ TOTAL
S korteksom With cortex	2	77	40	41	160	2	3	3	6	14
Brez korteksa Without cortex	12	178	109	82	381	8	15	31	17	71
SKUPAJ TOTAL	14	255	149	123	541	10	18	34	23	85

drugačno vlogo izjede, kot smo jo vajeni npr. v paleolitiku. Izjeda je v M. Triglavci služila predvsem za izdelavo trapezov s trirobim trnom s pomočjo lomljenja. Če se takšen lom ni posrečil, so nastali odpadki, ki so prikazani v t. 14: 164–169, 172–174. Včasih se je poskus ponesrečil celo dvakrat zapored (t. 14: 173).

O vseh drugih klinah z izjedo je težko reči, da so vse mezolitske glede na to, kako so bile najdene. Ravna in dolga, popolnoma direktno in delno inverzno retuširana klina (t. 17: 149) domnevno ni mezolitska, ampak neolitska. Izdelana je iz surovine nelokalnega izvora. Posebnost sta dve klinici mikrolitskih mer z izjedami (t. 16: 118; 18: 161), od katerih predvsem ena zaradi bilateralne izjede spominja na klinice tipa Montbani. Vendar sta izjedi za tip Montbani premalo odmaknjeni druga od druge (Rozy 1978a, 256, sl. 7).

Sveder (t. 16: 298; 19: 225):

Sveder je en sam, narejen na odbitku (t. 19: 225). Temu je treba dodati še en potencialni mikro sveder (t. 16: 298). Podobno kot v Viktorjevem spodmolu so bila ta orodja v mezolitiku M. Triglavce nepomembna.

Praskala (t. 19: 186–189; 20):

Praskala so narejena večinoma na odbitkih razen redkih primerkov, ki so bili narejeni na segmentiranih ali fragmentiranih klinah (t. 19: 188, 189; 20: 191 in morda 192). Ne glede na nastavek, iz katerega so narejena, so

Razpredelnica 2.9: Struktura mikro vbadal v pregledanem sedimentu M. Triglavce.
Table 2.9: Structure of microburins in the re-examined sediment from M. Triglavca.

Mikro vbadala Microburins	Baza Basal	Sredina Medial	Konec Terminal	SKUPAJ TOTAL
S korteksom With cortex	1	0	7	8
Brez korteksa Without cortex	30	8	21	59
SKUPAJ TOTAL	31	8	28	67

Usmerjenost* Orientation*	Baza Basal	Sredina Medial	Konec Terminal	SKUPAJ TOTAL
Levi Left	20	5	18	43
Desni Right	11	3	10	24
SKUPAJ TOTAL	31	8	28	67

* Usmerjenost mikro vbadal je kompatibilna z usmerjenostjo trapezov. / * Orientation of microburins is compatible with orientation of trapezes.

dable that many did not return to the site, i.e., base camp. There would be no reason for microburins to be used away from the site. If they were actually used as burins (chisel and/or perforator) they would have worked with them mainly at the site, i.e., home, and not on the hunt or foraging. Burins are in general very dubious tools and unimportant in the Mesolithic.

Burins:

There are no burins in the newly obtained material from M. Triglavca, except for one single dihedral burin. There are also only two or three possible burin spalls in the mass of unretouched flakes.

Notches and denticulates (Plates 14: 164–169, 172–177, 179; 16: 118; 17: 149–153; 18: 154–163):

There are only notches without denticulates in M. Triglavca. These were made mainly on blades or bladelets (Plates 14: 164–169, 172–175; 16: 118; 17: 149, 150–153; 18: 154–163,) and only exceptionally on flakes (Plate 14: 176, 177, 179). This fact, together with the large number of fractures immediately above the notch or below it (Plates 14: 164–169, 172–174; 17: 152) suggests a different role of the notch than we have been accustomed to in, e.g., the Palaeolithic. The notches at M. Triglavca served mainly for the production of trapezes with trihedral point, by means of fracturing. If such a fracture was unsuccessful, debris was created, as shown in Plate 14: 164–169, 172–174. An attempt was sometimes unsuccessful twice in succession (Plate 14: 173).

It is difficult to say that all the other blades with a notch are Mesolithic in view of how they were found. We suspect that the straight and long, completely direct and partially inversely retouched blade (Plate 17: 149) is not Mesolithic but Neolithic. It is made of raw material of non-local origin. Two blades of microlithic measurements with notches are a particularity (Plates 16: 118; 18: 161), one of which in particular is reminiscent of a Montbani type bladelet because of the bilateral notches. However, the notches are too close together for the Montbani type (Rozy 1978a, 256, Fig. 7).

Borers (Plate 16: 298; 19: 225):

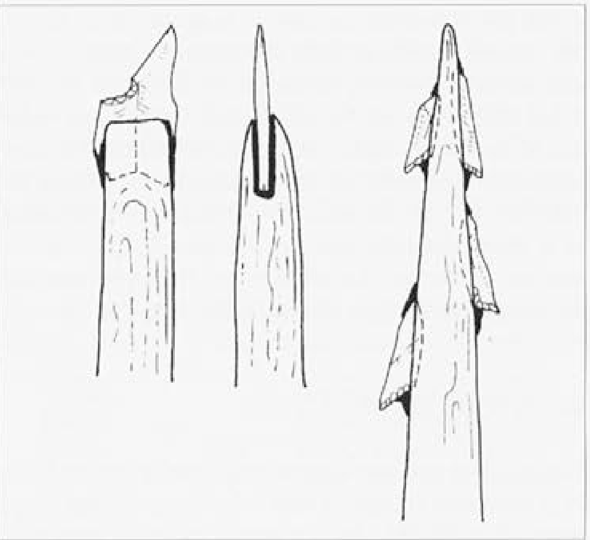
There is only one borer, made on a flake (Plate 19: 225). It is necessary to add to that a further potential micro borer (Plate 16: 298). As in Viktorjev spodmol, these tools were unimportant in the Mesolithic at M. Triglavca.

različno dobro izdelana. Na kar osmih praskalih so ostanki korteksa. Eno praskalo je krakelirano. Oblikovno izstopajo eno ozko praskalo (t. 19: 189) in dve gredljasti (t. 20: 216, 217). Tri praskala imajo precej ravno čelo (t. 20: 203, 204, 207), tako da bi jih lahko pripisala odbitkom tipa 'skrobacz'. Za nekatera praskala so značilni precej oglati zaključki čelnega dela (t. 19: 187; 20: 198, 210, 211, 214), kar je prej posledica površne izdelave kot namere izdelati takšno čelo. Kar nekaj praskal je poškodovanih (t. 20: 178, 218-221). Vprašanje je kdaj in kako so nastale poškodbe.

Nekaj posebnega je praskalu podoben izdelek, ki ima kljub visokemu čelu kot nož oster polkrožen rob (t. 20: 241). Tehnika, s katero je bil ostri rob izdelan je precej nenavadna: gre za več stopenj položnih retuš, ki so bile vse zalomljene kakih 3 mm od roba. Skratka prava mojstrovina obdelave kremena.

Retuširani odbitki (t. 19: 134, 135, 143, 145, 222, 223, 229, 230, 232):

Retuširani odbitki so v M. Triglavci relativno pogostejši (15 % vseh izdelkov) kot v Viktorjevem spodmolu (dobrih 9 % vseh izdelkov). Vendar je to lahko artefakt različno velikih vzorcev. Med retuširane odbitke prištevava poleg vseh drugih (t. 19: 134, 143, 145, 229, 230, 232) tudi strgala (t. 19: 222, 223) in odbitke s prečno retušo (t. 19: 135). V inventarju M. Triglavce so retuširani odbitki številčno zastopani v enakem vrstnem redu, kot so navedeni. Pri tem je treba poudariti, da je vseh zanemarljivo malo.



Sl. 2.1: Prikaz nasaditve trapezov in trikotnikov na toporišča puščic. Risba I. Turk.
Fig. 2.1: Demonstration of helving trapezes and triangles to the shaft of an arrow. Drawing by I. Turk.

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Endscrapers (Plates 19: 186-189; 20):

The endscrapers have been made for the most part on flakes, with a few exceptions made on segmented or fragmented blades (Plates 19: 188, 189; 20: 191 and perhaps 192). Irrespective of the blank from which they were made, they are variously well made. There are the remains of cortex on eight endscrapers. One endscraper had been thermally cracked. One narrow endscraper (Plate 19: 189) and two carinated ones (Plate 20: 216, 217) stand out in terms of design. Three endscrapers have a fairly straight front (Plate 20: 203, 204, 207), so that they could be ascribed to flakes of the 'skrobacz' type. Some of the endscrapers are characterised by a fairly angular ends of front (Plates 19: 187; 20: 198, 210, 211, 214), which is more likely a result of superficial manufacture than intention to produce such a front. A good few of the endscrapers are damaged (Plate 20: 178, 218-221). It is a question when and how the damage occurred.

A product like an endscraper which, despite the high front, has a very sharp semi-circular edge (Plate 20: 241) is something special. The technique by which the very sharp edge was produced is fairly unusual: it is a number of levels of invasive retouches which were all hinge fractured some 3 mm from the edge. A real masterpiece of worked flint.

Retouched flakes (Plate 19: 134, 135, 143, 145, 222, 223, 229, 230, 232):

Retouched flakes are relatively more common in M. Triglavca (15 % of all products) than in Viktorjev spodmol (a good 9 % of all products). However, this may be a product of the different sizes of sample. Among retouched flakes we include in addition to all others (Plate 19: 134, 143, 145, 229, 230, 232) also scrapers (Plate 19: 222, 223) and truncated flakes (Plate 19: 135). In the inventory of M. Triglavca, retouched flakes are numerically represented in the same order as they are cited. It must be stressed there are negligibly few of all of them.

Retouched blades and bladelets (Plates 16: 104-106, 110, 112-114, 116, 299; 17: 121-133; 18: 138-140, 144, 181-185):

There are essentially fewer retouched blades and bladelets than retouched flakes (Table 1.1). There are a few specimens among the blades with a truncation (Plate 18: 138-140, 144) and even fewer with a shoulder (Plate 18: 183, 184). Other blades are retouched on one or both edges with use, marginal, semi-abrupt or abrupt retouches (Plates 16: 104-106, 110, 112-114; 17: 121-129).

Retuširane kline in klinice (t. 16: 104-106, 110, 112-114, 116, 299; 17: 121-133; 18: 138-140, 144, 181-185):

Retuširanih klin in klinic je bistveno manj kot retuširanih odbitkov (razpredelnica 1.1). Med klinami so redki primerki s prečno retušo (t. 18: 138-140, 144) in še redkejši z izrobo (t. 18: 183, 184). Druge kline so retuširane po enem ali obeh robovih z uporabno, drobtinčasto, polstrmo ali strmo retušo (t. 16: 104-106, 110, 112-114; 17: 121-129). Retuša je samo izjemoma inverzna (t. 17: 123, 125). Posebnost so trije bazalni segmenti klin, ki imajo dorzalno na sami bazi lamelarno retušo (t. 17: 282).

Klinice imajo predvsem strmo retušo (hrbet), medtem ko je drugi rob neretuširan ali retuširan z drobtinčasto ali polstrmo retušo (t. 16: 110-112, 116). Bilateralna strma retuša je samo ena (t. 16: 113).

Trapezi (t. 12: 45-60, 61-83, 292-295; 14: 141-142, 146-148):

M. Triglavca je trenutno najdišče z največjim številom trapezov v Sloveniji. Zato lahko narediva nekaj začasnih sklepov.

Večina trapezov je narejenih z mikrovbadalno tehniko. Izjema so trije primerki (t. 12: 45, 59, 13: 65), od katerih je dolgi asimetrični trapez inverzno retuširan na krajši bazi (t. 12: 59). Vsi primerki so bili izdelani z običajno (direktno, polstrmo) prečno retušo. En kratki simetrični primerek (t. 12: 45), ki je narejen iz nelokalne surovine, je domnevno neolitske starosti, čeprav so takšni trapezi tudi v mezolitiku (Rozoy 1978b, t. 138 c).

Analogni primerki za inverzno retušo na bazi so v gradivu najdišča na Bregu, kjer ima eden od trapezov inverzno retuširano daljšo bazo (Frelih 1986, t. 2: 14). Tudi analogije za kratke simetrične trapeze, ki ne kažejo sledov mikrovbadalne tehnike, so v trapezih na najdišču Breg (Frelih 1986, t. 2: 13).

Trapeze lahko deliva na simetrične (enakokrake) dolge (t. 12: 46-47) in kratke (t. 12: 45, 48-49), asimetrične (neenakokrake) dolge (t. 12: 59; 13: 66-81, 83) in kratke (t. 13: 61-64), pravokotniške dolge (t. 12: 51-54, 58, 60) in kratke (t. 12: 55-57) ter rombaste (t. 13: 82) (G.E.E.M. 1969). Nekateri asimetrični trapezi (t. 13: 70, 74-75) so zelo podobni trapezom Montclus, drugi (t. 13: 68, 76) zopet trapezom Téviec s francoskih mezolitskih najdišč (G.E.E.M. 1969, sl. 9), le da so bili naši trapezi narejeni izključno z mikrovbadalno tehniko. Zaradi velike oddaljenosti med najdišči so takšne primerjave bolj ali manj nesmiselne, podobnosti pa so domnevno posledica konvergentnih razvojnih trendov.

Kot posebnost morava navesti neobičajen "trapez" majhnih dimenzij, z ravno majhno prečno retušo in retuširanim trnom (t. 13: 295). Primerek je bil domnevno narejen z mikrovbadalno tehniko. Analogen je na najdišču Breg (Frelih 1986, t. 2: 9).

The retouch is only exceptionally inverse (Plate 17: 123, 125). Three proximal segments of blades with parallel retouch dorsally on the bulbar end itself are a peculiarity (Plate 17: 282).

Bladelets mainly have an abrupt retouch (back) while the other edge is unretouched or retouched with marginal or semi-abrupt retouch (Plate 16: 110-112, 116). There is only one bilateral abrupt retouch (Plate 16: 113).

Trapezes (Plates 12: 45-60, 61-83, 292-295; 14: 141-142, 146-148):

M. Triglavca is currently the site with the highest number of trapezes in Slovenia. We can therefore reach some provisional conclusions.

The majority of trapezes are made with the microburin technique. Three specimens are exceptions (Plates 12: 45, 59, 13: 65), of which there is an elongated asymmetric trapeze inversely retouched on a shorter base (Plate 12: 59). All the specimens were produced with normal (direct, semi-abrupt) truncation. One short symmetrical specimen (Plate 12: 45), which is made from non-local raw material, is of suspected Neolithic age, although there were also such trapezes in the Mesolithic (Rozoy 1978b, Plate 138 c).

Analogous specimens of inverse retouch on the base are in the material of the site at Breg, where one of the trapezes has an inversely retouched longer base (Frelih 1986, Plate 2: 14). There are also analogies for short symmetrical trapezes that do not show traces of microburin techniques in the trapezes at the Breg site (Frelih 1986, Plate 2: 13).

Trapezes can be divided into symmetrical (equilateral) elongated (Plate 12: 46-47) and short (Plate 12: 45, 48-49), asymmetrical (not equilateral) elongated (Plate 12: 59; 13: 66-81, 83) and short (Plate 13: 61-64), rectangular elongated (Plate 12: 51-54, 58, 60) and short (Plate 12: 55-57) and rhombic (Plate 13: 82) (G.E.E.M. 1969). Some of the asymmetrical trapezes (Plate 13: 70, 74-75) are very similar to *Montclus* trapezes, others (Plate 13: 68, 76) again to *Téviec* trapezes from French Mesolithic sites (G.E.E.M. 1969, Fig. 9), except that our trapezes were made exclusively with a microburin technique. Because of the great distance between the sites, such comparisons are more or less meaningless, and similarities are merely a result of convergent development trends.

An unusual "trapeze" of small dimensions, with a small straight truncation and retouched point (Plate 13: 295) must be mentioned as a particularity. The specimen was presumably made with a microburin technique. There is an analogue at the Breg site (Frelih 1986, Plate 2: 9).

The microburin technique was normally used with a large truncation with all types of trapeze, but with a

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Mikrovbadalna tehnika je bila praviloma uporabljena pri veliki prečni retuši pri vseh tipih trapezov, pri majhni prečni retuši pa samo v posameznih primerih pri nekaterih tipih (t. 12: 47, 58; 13: 77). Ni jo na asimetričnih kratkih trapezih in rombastih trapezih.

Večina trapezov je po Löhrovi klasifikaciji leva (razpredelnica 2.4; t. 12: 51), kar pomeni, da je bila izjeda narejena na desni strani kline (t. 14: 264).

Zelo je izražena tendenca po dolgih primerkih, kar pomeni, da imajo trapezi podaljšano konico, ki se konča s trirobim trnom (razpredelnica 2.4; t. 12: 51; 13: 67, 74). Ta je neizrazit razen v enem primeru, ko je precej velik (t. 13: 67). Konica trna je pogosto odlomljena. Če je v celoti ohranjena, ni retuširana, razen izjemoma.

Majhna prečna retuša je lahko skoraj ravna (t. 12:

Razpredelnica 2.10: M. Triglavca, mere celih trapezov.
Table 2.10: M. Triglavca, measurements of whole trapezes.

Inv. štev. Inv. no.	Dolžina (mm) Length (mm)	Širina (mm) Width (mm)	Debelina (mm) Thickness (mm)
MT 45	14,8	13,2	3,9
MT 46	14	8,5	2
MT 47	19	10,5	2
MT 48	14	10	2,5
MT 49	12	10	2
MT 50	15	11	2,2
MT 51	20,8	11	3,4
MT 52	17	11,4	5,8
MT 53	16,4	10,2	2,6
MT 54	16,2	10	2,6
MT 55	17,8	11,4	3,2
MT 56	13,2	10,4	1,9
MT 57	11	10,5	2
MT58	14	9	2,1
MT 59	19,5	10,8	2,5
MT 60	16,2	10	2,9
MT61	15	10	3
MT 62	14	11	2,2
MT63	11,8	9,2	2
MT64	11	7	2,5
MT 65	11,8	7,4	2,2
MT 66	10	8,2	2
MT 67	27	10	2,2
MT 68	19	10,9	3,2
MT 69	15,4	10,8	3
MT 70	13,8	8,8	2,8
MT 71	13,2	7	2
MT 72	12	6,9	2
MT 73	12,4	7,5	3
MT 74	17,5	10	3,8
MT 75	17,8	8	2,3
MT 76	17,4	8,6	2,3
MT 77	13,8	9,8	2,8
MT 78	12,5	9	2,2
MT 79	13,2	9	2,8
MT 80	11,2	8	1,9
MT 81	9,5	8	1,5
MT 82	22	13,2	3,8
MT 83	12,2	8	2
MT	16	14,5	2,7
MT	17	9,8	2,5
MT	16,5	9,5	2,7
MT	13,5	7,5	2

small truncation only in individual cases with certain types (Plate 12: 47, 58; 13: 77). There are none on asymmetrical and rhombic trapezes.

The majority of trapezes are left hand according to Löhr's classification (Table 2.4; Plate 12: 51), which means that the notch was made on the right hand side of the blade (Plate 14: 264).

There is a very pronounced tendency for elongated specimens, which means that the trapezes have an extended point ending with a trihedral point (Table 2.4; Plates 12: 51; 13: 67, 74). This is not pronounced except in one specimen when it is fairly large (Plate 13: 67). The tip of the point is often broken. If it is preserved whole, it is only exceptionally retouched.

A small truncation can be almost straight (Plate 12: 58) to greatly curved (Plate 13. 74). A large or small base is only exceptionally retouched (Plates 12: 59; 13: 75). The retouch is always inverse and does not reduce the sharpness of the basal edge.

Damages to trapezes are especially interesting. A trihedral point can be smoothly fractured (Plate 13: 68, 74), either entirely (rarely) or only at the tip (frequent). In two cases, the trapeze had fractured below a large truncation (Plate 13: 83). On one case the trihedral point suffered only minor damage to the tip, in another it is completely fractured. In five cases we suspect that the trapeze was broken just above a small truncation or a little below it (Plate 14: 141, 146-148). If the documented fragments actually belong to a trapeze, it could have been broken during use as an arrow. We suspect that both trapezes and triangles could have been used as arrowheads, as shown in Fig. 2.1.

The various damages to trapezes must certainly be studied systematically, and an attempt made to establish how and why they occurred.

Typometric analysis of undamaged trapezes found at M. Triglavca gave interesting results (Table 2.10; sl. 2.2).

We analysed the relation between length and width, which roughly determines the shape or distinguishes between short and wide and long and narrow trapezes.

The normal frequency of distribution of the quotient of length and width (see curve S in the diagram and the 'bell' shape of the histogram, which is not typical of a normal distribution according to the results of the Shapiro Wilk's W-test) can be explained in two ways depending on the length of settlement of the site. It must be stressed that the majority of ratios relating to metric data of stone and bone artefacts have a similar distribution.

If there was a short, single settlement, the trapezes probably represent a deviation from the basic type (probable variety), which is most frequently in a value of length of 1.5 width (trapezes no. 48, 77, 79, 52, 61, 58, 55 and/or 78 or 64).

If there was long settlement, or a number of short settlements over an extended period, the trapezes pro-

58) do močno vbočena (t. 13: 74). Velika ali majhna baza je samo izjemoma retuširana (t. 12: 59; 13: 75). Retuša je vedno inverzna in ne zmanjšuje ostrine baznega roba.

Posebno zanimive so poškodbe trapezov. Trirobi trn je lahko gladko odlomljen (t. 13: 68, 74), in sicer v celoti (redko) ali samo na koncu (pogosto). V dveh primerih se je trapez odlomil pod veliko prečno retušo (t. 13: 83). Trirobi trn je pri tem v enem primeru utrpel samo manjšo poškodbo vršička, v drugem primeru pa se je v celoti odlomil. V petih primerih domnevava, da se je trapez odlomil tik nad majhno prečno retušo ali malo pod njo (t. 14: 141, 146-148). Če dokumentirani fragmenti dejansko pripadajo trapezom, bi se lahko odlomili med uporabo kot npr. osti puščic. Domnevava, da so se tako trapezi kot trikotniki uporabljali za puščične osti na način kot je prikazan na sl. 2.1.

V bodoče bo vsekakor treba sistematično proučiti različne poškodbe na trapezih in poskušati ugotoviti, kako in zakaj so nastale.

Tipometrična analiza nepoškodovanih trapezov, najdenih v M. Triglavci, je dala zanimiv rezultat (razpredelnica 2.10; sl. 2.2).

Analizirala sva odnos med dolžino in širino trapezov, ki v grobem določa obliko oz. ločuje med kratkimi in širokimi ter dolgimi in ozkimi trapezi.

Normalno frekvenčno porazdelitev količnika dolžine in širine (glej krivuljo S v diagramu in zvončasto obliko histograma, ki po rezultatu Shapiro-Wilkovega W-testa za normalno porazdelitev ni značilna) lahko razloživa na dva načina, odvisno od trajanja poselitve najdišča. Pri tem je treba poudariti, da ima podobno porazdelitev večina razmerij, ki se nanašajo na metrične podatke kamenih in koščenih artefaktov.

Če gre za kratko, enkratno poselitev, predstavljajo trapezi najverjetneje odstopanje od osnovnega tipa (morda variante), ki je najpogostejši v vrednosti dolžina je 1,5 širine (trapezi št. 48, 77, 79, 52, 61, 58, 55 in ali 78 ali 64).

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bably represent a development link from trapeze no. 57, of equal length and breadth, to trapeze no. 67, which is almost three times as long as wide, or development in the opposite direction. It is impossible to determine which shape in such a case was at the beginning and which at the end of the development cycle. According to this development scheme, a trapeze with a ratio between length and width of approximately 1.5 was used most.

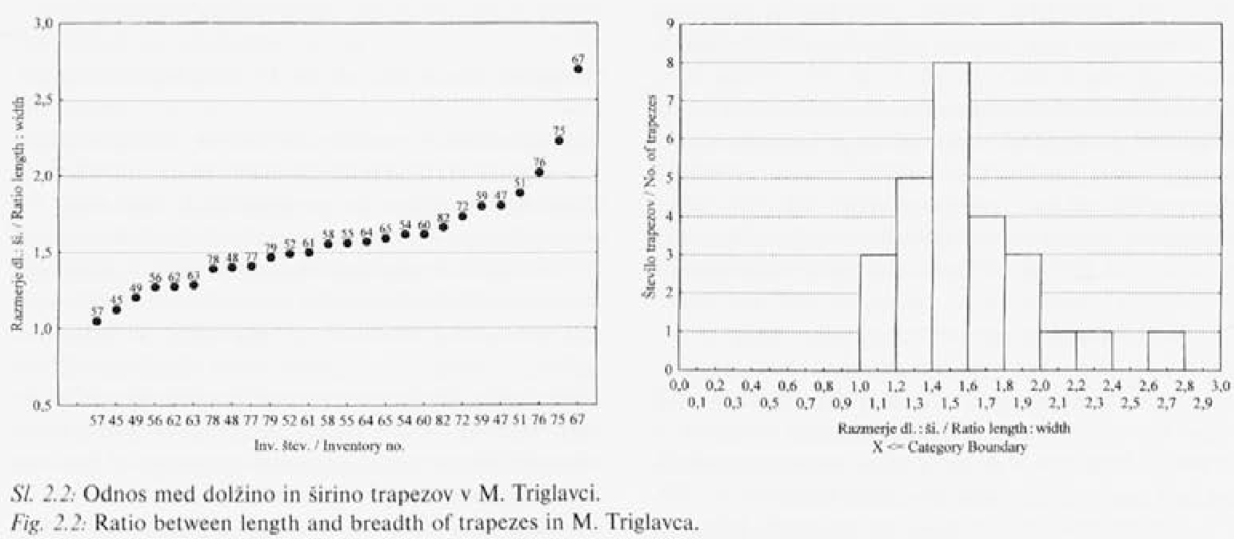
If the trapezes are arrowheads, the most common type of arrowhead could be helved mainly longitudinally and only exceptionally transversely. For transverse helving, trapezes with a length to width ratio less than 1.5 were mainly suitable. The shape of the trapeze may have been connected with the method of attachment. Transversely attached trapezes also do not need a trihedral point.

Truncated backed bladelets (Plates 10: 7-11, 13, 15, 18-20; 11: 21-22, 25, 27-35, 37-40, 290; 12: 41-44, 291; 16: 120):

Truncated backed bladelets have just as important a role in the inventory of M. Triglavca as they do in Viktorjev spodmol. The majority of specimens are not typical, but this is not a consequence of style, or its bad copying. Among the numerous atypical bladelets, backed and truncated, there is also one typical specimen (Plate 11: 290).

In Table 2.1 we treat truncated backed bladelets as triangles, because it is not entirely clear to us whether they are two different products or merely a simplification of the procedure of producing such an armature. In the plates, triangles are oriented differently to truncated backed bladelets.

There are a large number of damaged specimens among the truncated backed bladelets. The part at which the two longer sides of a triangle meet is normally fractured (Plates 10: 18-20; 11: 21-22). It is therefore diffi-



Sl. 2.2: Odnos med dolžino in širino trapezov v M. Triglavci.
Fig. 2.2: Ratio between length and breadth of trapezes in M. Triglavca.

Če gre za dolgo poselitev ali večje število kratkih poselitev v daljšem času, predstavljajo trapezi najverjetneje vezni razvoj od trapeza št. 57 enake dolžine in širine do trapeza št. 67, ki je skoraj 3-krat tako dolg kot širok, oziroma razvoj v obratni smeri. Nemogoče je namreč ugotoviti, katera oblika je bila v tem primeru na začetku in katera na koncu razvojnega ciklusa. V takšni razvojni shemi se je največ uporabljal trapez, ki ima razmerje med dolžino in širino približno 1,5.

Če so trapezi puščične osti, je bil najpogostejši tip puščice lahko nasajen predvsem vzdolžno in samo izjemoma prečno. Za prečno nasajanje so bili primerni predvsem trapezi, ki imajo razmerje med dolžino in širino manjše od 1,5. Tako bi bila oblika trapeza puščice lahko povezana z načinom nasaditve. Prečno nasajeni trapezi tudi ne potrebujejo trirobega trna.

Klinice s hrbtom in prečno retušo (t. 10: 7-11, 13, 15, 18-20; 11: 21-22, 25, 27-35, 37-40, 290; 12: 41-44, 291; 16: 120):

Klinica s hrbtom in prečno retušo ima v inventarju M. Triglavce prav tako pomembno vlogo kot v Viktorjevem spodmolu. Večina primerkov ni tipična, vendar to ni posledica sloga, oz. njegove slabe kopije. Med številnimi atipičnimi klinicami s hrbtom in prečno retušo je tudi en tipičen primerek (t. 11: 290).

V razpredelnici 2.1 obravnavava hrbte s prečno retušo kot trikotnike, ker nama ni popolnoma jasno, ali gre za dva različna izdelka ali samo za poenostavitev postopka izdelave kakšne armature. V tabelah so trikotniki obrnjeni drugače kot klinice s hrbtom in prečno retušo.

Med klinicami s hrbtom in prečno retušo je veliko poškodovanih primerkov. Običajno je odlomljen del, kjer naj bi se stikali obe daljši stranici trikotnika (t. 10: 18-20; 11: 21-22). Zato je težko sklepati o prvotni obliki izdelka. Nekateri odlomi so oblikovani tako (t. 10: 7, 20; 12: 43), da bi lahko nastali zaradi udarca. Zanimivo je, da nastopajo tudi skupaj s poškodbo stičišča najdaljše in najkrajše stranice (t. 10: 7; 12: 43). Oboje bi se dalo nekako povezati z uporabo teh izdelkov kot rezilc na puščici, prilepljenih s hrbtom druge najdaljše stranice na leseno toporišče, tako da je bil del, kjer se stikata obe najdaljši stranici, obrnjen navzgor (sl. 2.1). Manj običajni so odlomi stičišča najdaljše in najkrajše stranice (t. 10: 14, 17) in prelomi v bližini sredine klinice (t. 16: 120).

Veliko hrbtov je narejenih z gravetno retušo (t. 10: 18; 11: 24, 30), ki je v danem primeru samo tehnični izraz brez kronološkega predznaka. Hrbet je vedno povezan s prečno retušo. Najdaljša stranica običajno ni retuširana (t. 10: 8). V primerih ko je retuširana, je samo enkrat s strmo retušo, in to po celotni dolžini (t. 11: 37). V preostalih primerih je retuša drobtinčasta, delna ali

cult to decide the original shape of the product. Some of the fractures are shaped as if created by a blow (Plates 10: 7, 20; 12: 43). It is interesting that they also have damage to the point of contact of the longest and shortest side (Plates 10: 7; 12: 43). Both could be linked to the use of these products as blades on arrows, attached by the back of the second longest side to a wooden shaft so that the part at which the two longest sides meet is turned upwards (Fig. 2.1). Less usual are fractures at the point at which the longest and shortest sides meet (Plate 10: 14, 17) and fractures in the vicinity of the middle of the bladelet (Plate 16: 120).

Manyt of the backs are made with a gravette (crossed) retouch (Plate 10: 18; 11: 24, 30), which in this case is only a technical expression without chronological implications. The back is always associated with a truncation. The longest side is not normally retouched (Plate 10: 8). When it is, it is backed once, along the entire length (Plate 11: 37). In other cases the retouch is marginal, partial or total (Plates 10: 7, 9, 11, 20; 11: 24, 32; 12: 42), exceptionally also semi-abrupt (Plate 11: 26, 39). The majority of retouches on the longest side did not essentially reduce the cutting capacity of the edge of the side. If the products were used as arrowheads, for the most part the retouches contributed to their greater effectiveness.

Truncated backed bladelets are all sizes, but mainly within the limits of microliths. Some specimens are hypermicrolithic (pigmy) (Plates 10: 15; 11: 33, 35) and in their smallness exceed all microlithic artefacts known to date in Slovenia.

M. Brodar (1992, 27; 1995, 16) dealt with the phenomenon of microlithisation in Slovene Palaeolithic and Mesolithic sites and came to certain conclusions on the basis of comparison among sites. We personally believe that the debate on the microlithisation of products in Slovenia will ripen when all late Palaeolithic and Mesolithic sites have been examined with the same field methods and the same precision.

Triangles (Plates 10: 1-6, 16-17, 11: 23-24, 26, 36):

Triangles, strictly speaking, are not very frequent among products at M. Triglavca. Certainly there are relatively fewer than at Viktorjev spodmol, as is clear from the ratio triangles/trapezes, which is 0.4 in M. Triglavca and 2.5 in Viktorjev spodmol. The comparison is interesting because both products were armatures which presumably served as arrowheads. If they were not helved together, it means two types of arrow which could have been used at the same time but for different game. We can therefore expect specific differences in the ratios between the two products, created gradually in line with changing hunting habits and economic factors.

Deriving from the findings of Italian colleagues, totalna (t. 10: 7, 9, 11, 20; 11: 24, 32; 12: 42), izjemoma tudi polstrma (t. 11: 26, 39). Večina retuš na najdaljši stranici ni bistveno zmanjšala rezilnih sposobnosti roba stranice. Če so bili izdelki uporabljeni za puščice, so retuše kvečjemu pripomogle k njihovi večji učinkovitosti.

Klinice s hrbtom in prečno retušo so vseh velikosti, vendar v glavnem v mejah mikrolitov. Nekateri primerki so hipermikrolitski (pigmejski) (t. 10: 15; 11: 33, 35) in po svoji majhnosti presegajo vse doslej znane mikrolitske artefakte v Sloveniji.

S pojavom mikrolitizacije v slovenskih paleolitskih in mezolitskih najdiščih se je ukvarjal M. Brodar (1992, 27; 1995, 16) in podal določene sklepe na podlagi primerjav med najdišči. Sama sva menja, da bo razprava o mikrolitizaciji izdelkov v Sloveniji zrela, ko bodo vsa mlajšepaleolitska in mezolitska najdišča pregledana z enako terensko metodo in z enako natančnostjo.

Trikotniki (t. 10: 1-6, 16-17, 11: 23-24, 26, 36):

Trikotniki, strogo vzeto, niso ravno pogosti med izdelki v M. Triglavci. Vsekakor jih je relativno manj kot v Viktorjevem spodmolu, kar je razvidno iz razmerja trikotniki/trapezi, ki je v M. Triglavci 0,4, v Viktorjevem spodmolu pa 2,5. Primerjava je zanimiva, ker gre pri obeh izdelkih za armature, ki so domnevno služile kot osti puščic. Če jih niso nasajali skupaj, gre za dve vrsti puščic, ki so se lahko uporabljale hkrati, vendar za različno divjad. Zato lahko pričakujemo določene razlike v razmerju med obema izdelkoma, ki so nastajale sčasoma skladno s spreminjanjem lovskih navad in ekonomskih dejavnikov.

Izhajaoč iz ugotovitev italijanskih kolegov, da sta za razvoj mezolitika značilna porast trapezov in upad enakokrakih trikotnikov, je zanimivo tudi razmerje enakokraki trikotniki/trapezi. To razmerje je v M. Triglavci 0,1 in v Viktorjevem spodmolu 0,25.

Če razlike v enih in drugih razmerjih razloživa kronološko in ne upoštevava razlike v prostornini raziskanih sedimentov, ki ni velika, so najdbe v Viktorjevem spodmolu, za katere so značilni relativno številni trikotniki in relativno maloštevilni trapezi, starejše od najdb v M. Triglavci, za katero je značilno ravno obratno.

Razmerje trikotniki/trapezi se spreminja tudi v mlajšem mezolitiku (kastelnovjenu), če sodimo po najdišču *Riparo Gaban* (Kozłowski, Dalmeri 2000, tab. 13). V zgodnjem kastelnovjenu je bilo to razmerje 2,5, v poznem pa 0,18. Trikotnikov je bilo torej sčasoma vedno manj, trapezov pa vedno več.

Trikotniki se delijo na enakokrake (t. 10: 1-5) in raznostranične (t. 10: 14, 16; 11: 23-24, 26, 36). Med raznostranične sva prištela tudi nekaj fragmentov, katerih stranici se močno približujeta (t. 10: 6, 12), čeprav ni nujno, da ti pripadajo trikotnikom. En raznostranični

that a rise in the number of trapezes and fall in isosceles triangles are characteristic of the development of the Mesolithic, the ratio isosceles triangles/trapezes is also interesting. This ration is 0.1 in M. Triglavca and 0.25 in Viktorjev spodmol.

If the differences in one or the other ratio are explained chronologically and the difference in the volume of sediment examined, which is not large, is not taken into account, the finds in Viktorjev spodmol, for which relatively numerous triangles and relatively few trapezes is characteristic, are older than the finds in M. Triglavca, for which the reverse is the case.

The ratio triangles/trapezes also changes in the Late Mesolithic (Castelnovian), judging by the site *Riparo Gaban* (Kozłowski, Dalmeri 2000, Tab. 13). In the early Castelnovian this ratio was 2.5 and in the late 0.18. There were thus gradually fewer triangles and ever more trapezes.

Triangles are divided into isosceles (Plate 10: 1-5) and scalene (Plates 10: 14, 16; 11: 23-24, 26, 36). Among the scalene we also came across some fragments whose sides greatly converged (Plate 10: 6, 12), although they do not necessarily belong to triangles. One scalene triangle is very similar to a Montclus triangle. (G.E.E.M. 1969, sl. 3).

There are occasional specimens among both scalene and isosceles triangles that have an abrupt retouch on the longest side (Plates 10: 3; 11: 37). It is hard to imagine what these were used for. The commonest are triangles with partial marginal or semi-abrupt retouch on the longest side (Plates 10: 2, 5, 17; 11: 24, 26), which is more often at the distal than proximal end.

The typometry of triangles and truncated backed bladelets gave similar results as with trapezes. Various forms of geometric armature are connected or put another way, one form of the same armature flows into another (see Barbaza *et al.* 1991, 223 s). How to explain this continuous transformation is another matter.

Segments (Plate 16: 242, 303):

Not a single one of the products could without doubt be defined as a segment. Two solid flakes with convex back, but without a complete arc, are most similar to segments (Plate 16: 242, 303). Some truncated backed bladelets have such a convex truncation that they are reminiscent of segments (Plate 12: 41-42), although they are certainly not, because the arc is incomplete.

Points (Plate 17: 301):

There is only one point, which is damaged (Plate 17: 301). It is made with a very oblique truncation. The side opposite the truncation is marginally retouched.

trikotnik je zelo podoben trikotniku Montclus (G.E.E.M. 1969, sl. 3).

Tako med enakokrakimi kot raznostraničnimi trikotniki so redki primerki, ki imajo najdaljšo stranico strmo retuširano (t. 10: 3; 11: 37). Čemu so služili, si težko predstavljava. Pogostejši so trikotniki z delno drobtinčasto ali polstrmo retušo na najdaljši stranici (t. 10: 2, 5, 17; 11: 24, 26), ki je večkrat pri koncu trikotnika kot pri bazi.

Tipometrija trikotnikov in klinic s hrbtom ter prečno retušo je dala podoben rezultat kot pri trapezih. Različne oblike geometričnih armatur so vezne, ali drugače povedano, ena oblika iste aramture vezno preide v drugo (glej Barbaza *et al.* 1991, 223 s). Kako razložiti to veznost, pa je že drugo vprašanje.

Segmenti (t. 16: 242, 303):

Med izdelki ni niti enega, ki bi ga lahko nedvoumno opredelili kot krožni segment. Krožnemu segmentu sta še najbolj podobna dva masivna odbitka z usločenim hrbtom, ki pa nima popolnega loka (t. 16: 242, 303). Nekatere klinice s hrbtom in prečno retušo imajo prečno retušo tako izbočeno, da zato spominjajo na segment (t. 12: 41–42), čeprav to zagotovo niso, ker lok ni popoln.

Konice (t. 17: 301):

Konica je samo ena in še ta poškodovana (t. 17: 301). Izdelana je z močno poševno prečno retušo . Stranica nasproti prečne retuše je drobtinčasto retuširana.

Mikro konice (t. 15; 16: 97–101, 297):

Mikro konice so pogosto poškodovane, včasih do tolikšne mere, da je opredelitev lahko sporna.

Glede na obliko ločimo igličaste (t. 15: 89) in čolničaste konice (t. 15: 90). Igličasta oblika močno prevladuje nad čolničasto. Večina konic je dvojnih (dvokoničastih ali bikoničnih) in z dvojnim hrbtom. Domnevava, da so bile dvojne igličaste konice trnki, ki so imeli vrvico pritrjeno na sredini. Enojne konice so lahko služile predvsem kot konice puščic. Oblikovno se mikro konice v M. Triglavci bistveno ne razlikujejo od mikro konic v Viktorjevem spodmolu in mikro konic v najdiščih Tržaškega krasa. V večini primerov gre za lokalno varianto t. i. sovterske konice, ki je še najbolj podobna redkemu francoskemu "podtipu Dard" (G.E.E.M. 1972, 370, sl. 5:10).

Nekaj posebnega je primerek mikro konice s hrbtom, ki je terminalno polstrmo retuširana v konico (t.:16:297). Primerek sicer ni cel, vendar lahko rečeva,

Micropoints (Plates 15; 16: 97–101, 297):

Micropoints are often damaged, sometimes so much that their classification can be debatable.

In terms of shape, we distinguish elongated – 'needle-shaped' (Plate 15: 89) and 'navicular' micro points (Plate 15: 90). The 'needle' shape greatly predominates over the navicular. The majority of points are double (bipoints) and double backed. We suspect that needle-shaped bipoints were hooks which had a string attached in the centre. Single points could have served mainly as arrow tips. The design of micropoints in M. Triglavca does not essentially differ from that of micropoints in Viktorjev spodmol and micropoints at sites on the Triestine Karst. In most cases it is a matter of a local variant of the 'Sauveterrian' point, which is most similar to the rare French "Dard " sub-type (G.E.E.M. 1972, 370, sl. 5:10).

A specimen of a backed micropoint which is distally semi-abruptly retouched into a point (Plate:16:297) is rather special. The specimen is not whole but we can say that it is most similar to some microgravette points in Ciganska jama or *pointes d'Istres* (Brodar 1991, Plate 16; G.E.E.M. 1972, Fig. 4).

Bone and other products (Figs. 2.3, 2.4, 2.6):

The bone and above all antler industry of M. Triglavca has several times been highlighted as a particularity in the Mesolithic material partially published to date. We therefore think that it is necessary to publish from the material of the excavations of F. Leben also the overlooked or deliberately never mentioned phalanges of red deer with holes found in 1984 in quadrats 5–7. A proximal phalange, with a circular hole on the dorsal side and barely visible hollow on the opposite, ventral side (Fig. 2.3 a–b), was found at a depth of -250 cm, and a medial phalange, with a heart-shaped hole on the lateral side without any hollow on the opposite, medial side (Fig. 2.3 a–b), was found at a depth of -349 cm.

While the first phalange may be Neolithic in view of the depth, the second could be Mesolithic for the same reason.

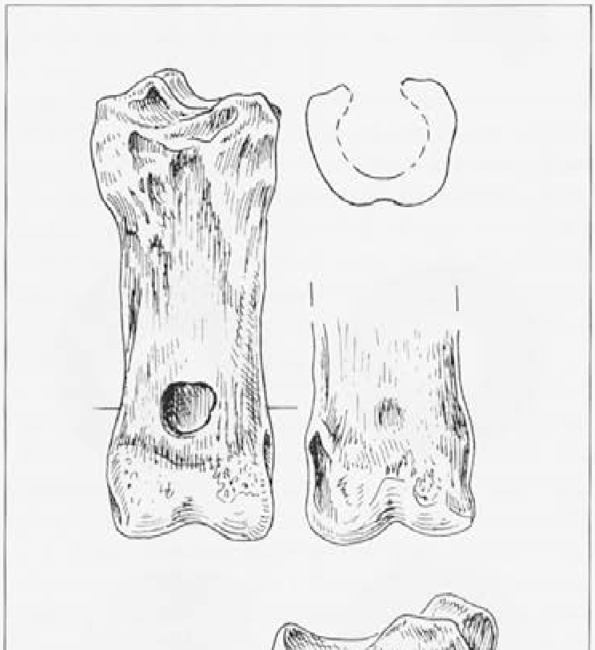
Both specimens belong in a design sense among classical Palaeolithic whistles (see Dauvois 1989), which are a rarety in the Mesolithic (Rozoy 1978b, 1006), so that the finds in M. Triglavca already deserve every attention because of this.

In the case of the proximal phalange, because of the hollows (see proximal phalange of a pig with two hollows, Fig. 2.6: 285) we doubt that the holes are man made, but with the medial phalange there are no grounds for such doubts (for the question of holes in bones see Turk *et al.* 2001 and Horusitzky 2003).

Both holes are unusual in being pierced or punda je še najbolj podoben nekaterim mikrogravetskim konicam v Ciganski jami ali konicam Istres (*pointes d'Istres*) (Brodar 1991, t. 16; G.E.E.M. 1972, sl. 4).

Koščeni in drugi izdelki (sl. 2.3, 2.4, 2.6):

Koščena in predvsem rožena industrija M. Triglavce je bila v dosedanjih delnih objavah mezolitskega gradiva večkrat izpostavljena kot posebnost. Zato misliva, da je treba iz gradiva izkopavanj F. Lebna objaviti tudi spregledani ali namenoma nikoli omenjeni prstnici (falangi) navadnega jelena z luknjo, najdeni leta 1984 v kvadratih 5-7. Gre za prvo (v anatomskem smislu) prstnico z okroglo luknjo na dorzalni strani in komaj vidno vdolbinico na nasprotni ventralni strani (sl. 2.3 a-b), najdeno na globini -250 cm, in za drugo prstnico s srčasto luknjo na lateralni strani brez vsake vdolbinice na nasprotni medialni strani (sl. 2.3 a-b), najdeno na globini -349 cm.



Sl. 2.3 a: Preluknjani prva in druga prstnica navadnega jelena. Izkopavanja F. Lebna. Risba D. Knific Lunder.
Fig. 2.3 a-b: Pierced proximal and medial phalange of red deer. F. Leben excavation. Drawing D. Knific Lunder.

ched and not drilled as we could reasonably expect for such a late period (for techniques of manufacture see Turk *et al.* 2003). However, almost all the holes in the *Columella* shells found at M. Triglavca are clearly pierced or punched (see also Mikuž and Turk in this volume). Such shells were presumably a popular ornament in the Mesolithic. It appears that this simple and effective way of making holes was retained for a long time, and was used mainly for making holes in various 'hulls', including bone shell (cortical bone).

More important than the two phalanges is the fragment of a bird's bone diaphysis with one hole and the remains of another two, which are at right angles to the first (Fig. 2.4). We suspect that it is a small flute, although the position of the holes was rather unusual. If the lateral holes served for a string, it could have been a pendant in the shape of a whistle. The preserved hole is undoubtedly artificial, because it was hollowed out obliquely to the axis of the diaphysis, so that the shape is reminiscent of a rhombus. The two parallel sides and a third have an edge in the shape of a funnel, from the medular surface outwards. The surface of the funnel is in relief, which suggests hollowing. Such an edge could also be formed with etching but the hole in that case would be rounder, and the surface smoother. The partially preserved holes are almost circular and slightly displaced. One has part of the rim of similar funnel shape as the preserved hole. The other has part of the rim preserved similar to a drilled hole.

The walls of the diaphysis are 0.5 mm thick, and the diameter 4.5-5.0 mm. The largest preserved length is 20 mm. The bone is highly polished, presumably from

Sl. 2.3 b: Preluknjani prva in druga prstnica navadnega jelena. Merilo v cm. Izkopavanja F. Lebna. Foto M. Zaplatil.
Fig. 2.3 a-b: Pierced proximal and medial phalange of red deer. Measurements are given in cm. F. Leben excavation. Photo M. Zaplatil.

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Sl. 2.4: Preluknjana ptičja diafiza (piščal ali obesek v obliki piščali?), najdena v ponovno pregledanem sedimentu M. Triglavce. Merilo je podano v cm..Foto M. Grm.
Fig. 2.4: Pierced bird's diaphysis (flute or pendant in the shape of a flute?) found in re-examined sediments of M. Tirglavca. Measurements are given in cm. Photo M. Grm.

Medtem ko je prva prstnica glede na globino lahko neolitske starosti, je druga glede na globino lahko mezolitska.

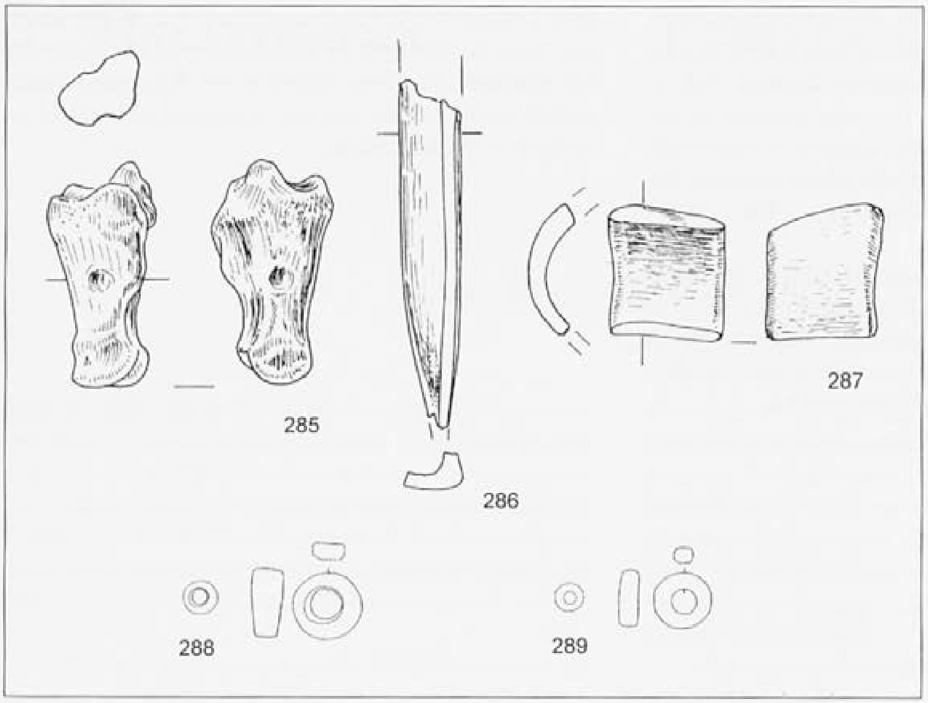
Oba primerka sodita oblikovno med klasične paleolitske žvižgavke (glej Dauvois 1989), ki so v mezolitiku redkost (Rozoy 1978b, 1006), tako da najdbi v M. Triglavci že zaradi tega zaslužita vso pozornost.

Če lahko pri prvi prstnici zaradi vdolbinice (glej prvo prstnico svinje z dvema vdolbinicama, sl. 2.6: 285) podvomiva o tem, da je luknjo naredil človek, pa pri drugi prstnici takšen dvom ni utemeljen (za vprašanje lukenj v kosteh glej Turk *et al.* 2001 in Horusitzky 2003).

Nenavadno pri obeh luknjah je to, da sta prebiti ali predrti in ne izvrtani kot bi za tako pozni čas upravičeno pričakovali (za tehniko izdelave glej Turk *et al.* 2003). Vendar so evidentno prebite ali predrte tudi skoraj vse luknjice na hišicah golobice, najdene v M. Triglavci (glej tudi Mikuž in Turk, ta zbornik. Ta polž je bil v mezolitiku domnevno priljubljen okrasek. Kaže, da se je ta preprosta in učinkovita tehnika izdelovanja lukenj obdržala zelo dolgo in da so jo uporabljali predvsem za luknjanje različnih lupin, kamor sodi tudi kostna lupina (kortikalna kost).

Pomembnejši od obeh prstnic je fragment ptičje diafize z eno luknjo in ostanki še dveh, ki sta pravokotni na prvo (sl. 2.4). Domnevava, da gre za majhno piščal, čeprav je položaj lukenj nekoliko neobičajen. Če sta stranski luknji služili za vrvico, gre lahko za obesek v obliki piščali. Ohranjena luknja je nedvomno umetna, ker je bila izdolbena poševno na os diafize, tako da po obliki

Sl. 2.5: Mikro jagodi, najdeni v ponovno pregledanem sedimentu M. Triglavce. Zgoraj: bela kalcitna jagoda, kemično očiščena (1-2). Spodaj: črna, neočiščena jagoda s tanko kalcitno prevleko (3-4). Merilo je podano v mm. Foto F. Cimerman.
Fig. 2.5: Micro beads found in re-examination of the sediments of M. Triglavca. Upper; white calcite bead, chemically cleaned (1-2). Lower: black, uncleaned bead with a thin calcite coating (3-4). Measurements are given in mm. Photo F. Cimerman.



Sl. 2.6: Prva prstnica svije z odtiskom zoba na medialni in lateralni strani (285), koščeno šilo (286), koščen obroček (287) in dve kamniti jagodi (288, 289). Vse 1:1, št. 288 in 289 tudi 2:1. Risba D. Knific Lunder.

Fig. 2.6: Proximal phalange of a pig with impression of teeth on the medial and lateral sides (285), bone awl (286), bone hoop (287) and two stone beads (288, 289). All 1:1, no. 288 and 289 also 2:1. Drawing D. Knific Lunder.

spominja na romb. Dve vzporedni stranici in tretja imajo rob v obliki lijaka, in sicer od medularne površine navzven. Površina lijaka je reliefna, kar kaže na dolbljenje. Takšen rob bi lahko nastal tudi pri jedkanju, vendar bi bila luknja v tem primeru bolj okrogla, površina pa bolj gladka. Delno ohranjeni luknji sta skoraj okrogli in rahlo zamaknjeni. Ena ima del oboda podobne lijakaste oblike kot ohranjena luknja. Druga ima ohranjeni del oboda podoben izvrtani luknji.

Stene diafize so debele 0,5 mm, njen premer je 4,5 do 5,0 mm. Največja ohranjena dolžina je 20 mm. Kost je močno zglajena, domnevno tudi zaradi uporabe. Močne zgladitve so vidne ponekod na izboklinah lijaka ohranjene luknje in na robu ene od delno ohranjenih lukenj.

Druge koščene najdbe predstavljata fragment šila in obročka (sl. 2.6: 286, 287). Skoraj enak obroček iz rogovine je bil najden v sovterjenski plasti najdišča *Riparo Gaban* (Kozłowski, Dalmeri 2000, 22, sl. 22b). Obroček naj bi sodil med 'standardne' mezolitske izdelke.

Neobičajni in redki najdbi sta dve prevrtani mikro jagodi (sl. 2.5; 2:6: 288, 289). Večja, ki v premeru meri 3,75 mm, je narejena iz kalcita. Gledano od strani je rahlo konična. Luknja je z obeh strani povrtana. Manjša, ki v premeru meri 3 mm, je narejena iz črne kamnine. Njeni robovi so bolj zaobljeni, oblika pravilnejša. Luknja ni povrtana in je rahlo ekscentrična. Obe jagodi sta vrhunska izdelka, narejena s hipermikrolitskimi svedri premera 1 mm, ki jih kljub natančnemu pregledovanju sedimentov nismo našli. Našli smo kvečjemu en primerek dvomljive vrednosti, izdelan na mikro konici s hrbtom (t. 16: 298)

Dobro vzporednico za obe mikro jagodi poznava v kastelnovjenski plasti Stenašce na Tržaškem krasu (Bia-

use. High polishings are visible in places on the hollowed funnel of the preserved hole and on the edge of one of the partially preserved holes.

Other bone finds include a fragment of an awl and a hoop/band (Fig. 2.6: 286, 287). An almost identical band from antler was found in the Sauveterrian layer at the site *Riparo Gaban* (Kozłowski, Dalmeri 2000, 22, Fig. 22b). The band would be among 'standard' Mesolithic products.

Two drilled micro beads (Fig. 2.5; 2:6: 288, 289) are unusual and rare finds. The larger, measuring 3.75 mm, is made of calcite. It is slightly conical viewed from the side. The hole is drilled from both sides. The smaller, 3 mm in diameter, is made from a black rock. Its edges are more rounded, the shape more regular. The hole was not drilled and is slightly exocentric. Both beads are top products, made with a hypermicrolithic 'drillbit' of a diameter of 1 mm. Despite careful examination of the sediments, we found at most one specimen of such a 'drillbit', of doubtful value, made on a backed micropoint (Plate 16: 298).

We know of a good parallel to the two micro beads in the Castelnovian layer of Stenašca (*Grotta dell'Edera*) on the Triestine Karst (Biagi *et al.* 1993, 48, 61). There are also typological, although not also chronological, parallels to them in Mesolithic sites on the Ljubljansko barje, Maharski prekop (Bregant 1974, sl. 2-3) and above all Hočevarica (oral data A. Velušček). Similar beads, but bone and considerably larger were also found in the Neolithic layer of the Romagnano III site and in the grave Romagnano-Loc in Italy (Broglio 1971, Fig. 19: 3-4).

Despite the mass of remains of red deer, only one gi *et al.* 1993, 48, 61). Tipološke, ne pa tudi kronološke vzporednice zanju so tudi v eneolitskih najdiščih Ljubljanskega barja, Maharskem prekopu (Bregant 1974, sl. 2-3) in predvsem Hočevarici (ustmeni podatek A. Veluščka). Podobne jagode, vendar koščene in precej večje, so bile najdene tudi v neolitski plasti najdišča Romagnano III in v grobu Romagnano-Loc v Italiji (Broglio 1971, sl. 19: 3-4).

Kljub množičnim ostankom navadnega jelena, je bil najden en sam jelenov podočnik ('grandl'), ki pa je bil tako poškodovan v ognju, da se ne ve ali je bil prevrtan ali ne. Znano je, da so bili prevrtani jelenovi podočniki priljubljeni del nakita tudi v mezolitiku.

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deer's canine tooth (pearl tooth) was found, but which had been so damaged by fire that it was impossible to tell whether it had been drilled or not. It is known that a drilled deer's canine was also a popular element of jewellery in the Mesolithic.

3. Malakofavna

3. Malacofauna

Vasja Mikuž & Ivan Turk

Med morskimi polži močno prevladujejo hišice morske golobice (*Columbella rustica* (Linné, 1758). Vse so preluknjane (32 primerkov). Tem hišicam je treba dodati še 9 fragmentiranih, o katerih ne vemo točno, ali so bile preluknjane ali ne. Med izkopavanji F. Lebna je bila najdena samo ena preluknjana hišica golobice in še ta pri obdelavi vzorca sedimentov (Pohar, Josipovič 1992, t. 1: 4).

Hišice so različno preperele. Nekako polovica jih je 'svežega' videza, kot da bi bile pravkar pobrane v morju. Druga polovica je bolj ali manj močno preperela. Vprašanje je, ali so preperele v najdišču ali na morski obali. Šest primerkov (2 preluknjani hišici in 5 fragmentov hišic), je temno sivih, kar je posledica redukcije. Hišice so se lahko reducirale v posebnem sedimentnem okolju že v morju (taki primeri so znani pri fosilnih mehkužcih) ali v ognjišču, naključno ali kot kulinarična poslastica. Zanimivo je, da so podobno reducirani tudi številni fragmenti hišic kopenskih polžev, ki so precej večji od golobice. Če bi golobico uživali, bi morali zaradi njenega ozkega ustja nujno naluknjati ali zdrobiti hišico.

Vse luknje so prebite in zelo variirajo v velikosti in obliki. V treh primerih je lupina hišice na strani z luknjo ravno zbrušena, tako da hišica lepo stoji. Tako brušenje hišic bi imelo svoj smisel, če bi hišice služile npr. za igro.

Glede na ugotovljeno meniva, da hišice golobic niso bile samo nakit, kot običajno mislijo in razlagajo (Pohar, Josipovič 1992; Brodar 1992; Dalmeri, Fiocchi 1998), ampak so lahko služile tudi drugim namenom: od kulinaričnih do razvedrilnih, lahko celo različnim hkrati.

Obstaja še možnost, ki je od vseh najbolj verjetna. Takšne ali podobne poškodbe na hišicah polžev poznamo tudi iz geološke preteklosti. Bałuk in Radwański (1996) predstavljata iz srednjemiocenskih skladov Poljske zelo podobne poškodbe na hišicah različnih vrst polžev. Takšne poškodbe pa so posledica plenilcev, stomatopodnih rakov iz družine Squillidae, ki se hranijo z mehkužci, in živijo tudi v današnjih morjih. Tudi pri fosilnih hišicah se vidijo poškodbe na določenem izbranem delu hišice, kjer jo je predator z udarci svojih trnastih grabilnih nog najlažje razbil in mehke dele izvlekel ter

The shells of *Columbella rustica* (Linné, 1758) greatly predominate among seashells. All are pierced (32 specimens). To these shells must be added a further 9 fragmented ones, which we do not know exactly whether they were drilled or not. During F. Leben's excavations, only one pierced *Columbella* shell was found, and even this while processing a sample of sediment (Pohar, Josipovič 1992, Plate 1: 4).

The shells are variously weathered. About half have a "fresh" appearance, as if only just collected in the sea. The other half are more or less strongly weathered. It is a question whether they were weathered at the site or on the sea coast. Six specimens (2 pierced shells and 5 fragments of shells) are dark grey, which is a result of reduction. The shells can be reduced in a particular sedimentary environment, even in the sea (such examples are known in fossil shells) or in a hearth, coincidently or as a culinary delicacy. It is interesting that numerous fragments of shells of land snails, which are considerably bigger than *Columbella* shells, are similarly reduced. If they wanted to eat these marine gastropods, because of its narrow aperture, they would have to make a hole or smash the shell.

All the holes were punched and vary greatly in size and shape. In three cases the shell has been polished on the side of the hole so that the shell stands nicely. Such polishing of shells would make sense if the shell served e.g., for a game.

In view of the above, we believe that *Columbella* shells were not just jewellery as they are normally considered and explained (Pohar, Josipovič 1992; Brodar 1992; Dalmeri, Fiocchi 1998), but could also serve other purposes: from culinary to entertainment, even various simultaneously.

There is another possibility that is the most probable of all. Such or similar damage to shells of snails is also known from the geological past. Bałuk and Radwański (1996) present very similar damage to shells of various kinds of snail from the Middle Miocene layers of Poland. Such damage is the result of predators, stomatopod shrimps from the Squillidae family, which feed on molluscs, and also live in the sea today. With fossil shells, too, damage to certain chosen parts of shells is visible, where the predator most easily fractured it with pojedel. Povsem enake primere imamo tudi pri nas na istih polžjih vrstah in v enako starih kamninah (okrog 15 milijonov let) v najdiščih blizu Šentjerneja na Dolenjskem.

Po pregledu dela avtorice Y. Taborin (1993), ki obravnava luknje na hišicah in lupinah različnih terciarnih mehkužcev in nekaterih skeletih drugih organizmov iz paleolitskih najdišč Francije, misliva, da je med njimi nekaj primerov, ki so morda delo naših prednikov, v glavnem pa gre za poškodbe najrazličnejših morskih plenilcev. Torej so naši predniki iskali med fosilnimi mehkužci takšne, ki so že imeli najrazličnejše plenilske poškodbe na hišicah ali lupinah, kar se nama zdi tudi precej verjetno.

Pod lupo sva pregledala eno belo in eno sivo fragmentirano hišico, ki sva ju tudi prerezala.

Bela hišica je bila že "dalj časa" zapuščena ob morski obali na kar sklepava po naravno odlomljenih in zglajenih robovih hišice. Pod mikroskopom se vidijo številne zelo drobne luknjice endolitskih organizmov iz skupine briozojev ali pa spužev.

Siva hišica ima bolj sveže odlomljene robove, malo zglajene in na njej ni luknjic endolitskih organizmov. Na zunanji strani zadnjega zavoja hišice je v vzdolžni smeri poglobljena nazobčana linija, ki predstavlja plenilsko poškodbo nekdanjega ustja. Plenilec (določena vrsta rakovic) ni uspel priti do mehkih delov in polž je svojo hišico regeneriral. Prav takšne primere poznamo tudi pri številnih fosilnih vrstah.

V prerezu "sive hišice" oziroma na njeni steni ni vidnih nikakršnih poškodb (razpok, porušitev), ki bi lahko nastale zaradi močnejšega segrevanja. Siva barva je najverjetneje posledica anaerobnega okolja, v katerem je dalj časa ležala polžja hišica (blato z razpadajočo organsko substanco, močvirje, morda vlažen pepel).

Poleg hišic golobice je bilo pri pregledovanju deponije sedimentov najdenih še 9 hišic drugih morskih polžev. Dve celi in z majhno luknjo ter ena fragmentira-

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a blow of its sharp pincers and drew out and ate the soft parts. There are identical examples here in the same snail species and in the same age of rocks (around 15 million years) in sites close to Šentjernej in Dolenjsko.

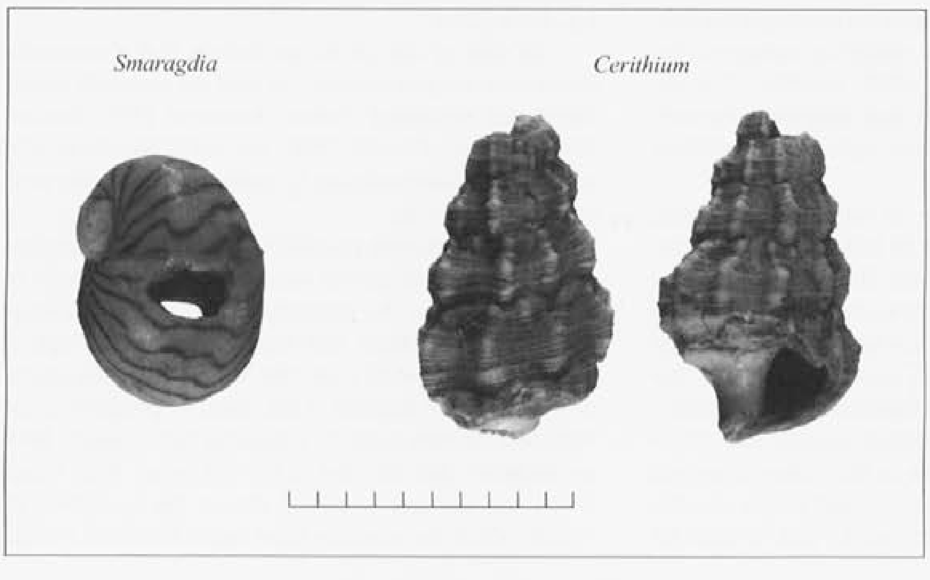
After a review of the work of Y. Taborin (1993), who treats holes in shells of various Tertiary molluscs and some skeletons of other organisms from Palaeolithic sites in France, we believe that there are some examples among them which are perhaps the work of our forebears, but for the most part this is damage by very varied sea predators. So our forebears sought among fossil molluscs those that already had various predation damage to the shells, which also seems to us fairly likely.

We examined under the microscope and also sectioned one white and one grey fragmented *Columbella* shell.

The white shell had already been abandoned by the seashore"for an extended period", which we concluded by the nature of the fractured and polished edges of the shell. Under the microscope could be seen numerous very tiny holes of endolithic organisms from the group of Bryozoa or sponges.

The grey shell has more freshly broken edges, only slightly polished and there are no holes of endolithic organisms on it. There is a deep line of teeth marks on the outside of the last whorl of the shell in a longitudinal direction, which represents predation damage to the former mouth. The predator (a certain species of crustacean) did not succeed in reaching the soft parts and the shell regenerated. Such examples are also known with numerous fossil species.

In the cross section of the "grey shell", or on its walls, there is no visible damage (cracks, crumbling), which would have been created by strong heating. The grey colour is more likely the result of the anaerobic environment in which the snail shell lay for a long time (mud with composting organic substance, swamp, perhaps damp ash).



Sl. 3.1: Najdbi morskih polžev *Smaragdia viridis* in *Cerithium* sp. v pregledanem sedimentu M. Triglavce. Merilo je podano v mm. Foto M. Grm.

Fig. 3.1: Finds of sea molluscs *Smaragdia viridis* and *Cerithium* sp. In the examined sediment of M. Triglavca. The measurement is given in mm. Photo M. Grm.

na pripadajo vrsti *Smaragdia viridis* (Linné, 1758), ena, samo delno ohranjena, pa vrsti *Cerithium* sp. (sl. 3.1). Po ena poškodovana hišica je opredeljena kot *Littorina neritoides* (Linné, 1758) in kot ?*Tornus* sp. Slednja je preluknjana in temno sive barve. Tri močno fragmentirane hišice niso določljive. Ena od njih je temno sive barve.

Med školjkami je največ ostankov (116 majhnih in 2 večja fragmenta lupine) užitne klapavice (*Mytilus* sp.) in en fragment lupine rodu *Pecten*. Določeni ostanki pripadajo tako izključno morskim vrstam školjk.

Ostankov kopenskih polžev je več deset tisoč, če štejeva vse fragmente. Verjetno so zastopane vse vrste, ki so bile določene v Viktorjevem spodmolu.

Hišice manjših polžev (teh je več tisoč) so bolj ali manj cele, hišice večjih pa so praviloma vse fragmentirane.

V sedimentu je bilo ogromno koščkov tankih polžjih hišic, ki domnevno pripadajo večjim vrstam kopenskih polžev, pa tudi precej ploščic zakrnelih hišic golih polžev.

Veliko fragmentov večjih hišic in redke ploščice zakrnelih hišic so temno sive barve, ki nastane v redukcijskem okolju. Zato domnevava, da se je veliko hišic po naključju znašlo v ognjišču ali pa so polže ljudje pekli na žerjavici s hišicami vred. Na ražnju so se občasno domnevno znašli tudi goli polži.

Ostanki hišic velikih kopenskih polžev se pojavljajo v velikem številu v številnih mezolitskih najdiščih širom po Evropi. Večinoma gre za jamska najdišča, kjer bi lahko polži prezimovali. Druga razlaga je, da so v mezolitiku polži predstavljali del vsakodnevne prehrane ali da so jih ljudje uživali pri slovesnih pojedinah (glej npr. Miracle 2002). To razlago podpirajo domnevno ožgane hišice v Viktorjevem spodmolu in M. Triglavci ter najdbe številnih hišic velikih polžev v planih mezolitskih najdiščih, kot npr. v najdišču Sered' I, Mačianske vŕšky (Bárta 1972, 64).

V M. Triglavci je približno toliko 10–20 mm velikih fragmentov hišic kopenskih polžev kot enako velikih kostnih fragmentov (teh je dobrih 6 težnih % od vseh klastov v frakciji), iz česar sklepava, da gre za izredno.veliko število polžev, ki so kakor koli že končali v M. Triglavci. Če predstavljajo fragmenti hišic velikih polžev kot je npr. *Helix pomatia*, kulinarične ostanke, so v M. Triglavci v določenem obdobju pojedli izredno velike količine polžev.

In addition to *Columbella* shells, 9 shells of other sea molluscs were found in the examined deposits of sediments. Two whole and with small holes and one fragmented belong to the species *Smaragdia viridis* (Linné, 1758), and one, only partially preserved to the species *Cerithium* sp. (Fig. 3.1). One each damaged shell was identified as *Littorina neritoides* (Linné, 1758) and ?*Tornus* sp. The latter is pierced and dark grey. Three greatly fragmented shells were not identified. One of them is dark grey.

Among the mussels there are most remains (116 small and 2 larger fragments of shell) of edible oyster (*Mytilus* sp.) and one fragment of shell of the genus *Pecten*. The identified remains belong exclusively to sea species of shell.

There are several tens of thousand of remains of land snails if we count all the fragments. Probably all the species identified for Viktorjev spodmol are represented.

The shells of smaller snails (several thousand of these) are more or less whole, but the shells of larger ones are generally all fragmented.

There was a huge number of pieces of thin snail shells in the sediment, which presumably belong to larger specimens of species of land snail, as well as a significant number of plates of atrophied shells of slugs.

A lot of the fragments of the larger shells and occasional plates of the atrophied shells are grey in colour which is typical of a reduction sedimentary environment. We therefore suspect that many shells found there way by chance into the hearth or that people baked snails of the hot embers together with the shells. The occasional slug presumably found itself on a spit, too.

The remains of shells of large land snails appear in large numbers in numerous Mesolithic sites across Europe. Most are cave sites, where snails could overwinter. Another explanation is that snails in the Mesolithic represented part of the daily diet or that people ate them on festive occasions (see e.g. Miracle 2002). The presumed burnt shells of large snails in open air Mesolithic sites, such as Sered' I, Mačianske vŕšky (Bárta 1972, 64), would support such an explanation.

There are approximately as many 10–20 mm fragments of shells of land snails in M. Triglavca as the same size of bone fragments (there is a good 6 weighted % of them of all clasts in the fraction), from which we conclude that it is an extremely large number of snails, which ended up somehow in M. Triglavca. If fragments of shells of large snails like *Helix pomatia* represent culimary remnants, at some point in M. Triglavca they ate an extremely large number of snails.

4. Ostanki ektotermnih vretenčarjev

4. Remains of Ectothermic Vertebrates

Ivan Turk

Vzorec ektotermnih vretenčarjev ni tako bogat kot v Viktorjevem spodmolu, vendar je enako pester.

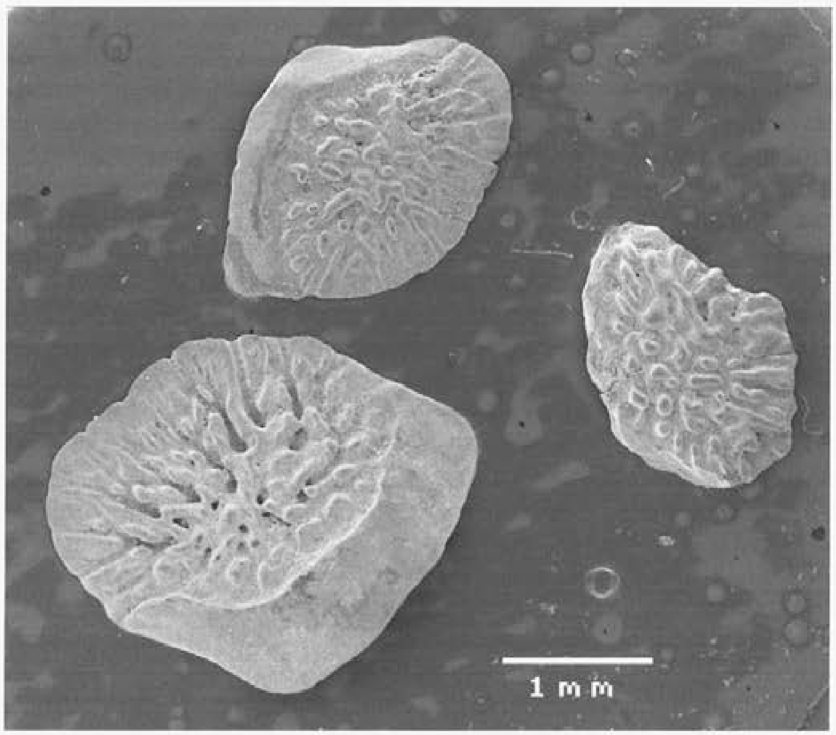
Ostanke rib predstavljajo dve luski, 9 vretenc in 4 zobje.

Kuščarji so zastopani predvsem z velikim številom kožnih ploščic, ki smo jih v velikem številu našli tudi v vzorcu, ki smo ga vzeli neposredno iz mezolitske plasti. Večina dermalnih ploščic pripada slepcu (*Anguis fragilis*). Zato se postavlja vprašanje ali gre za kuhinjske odpadke ali za naravno poginule slepce.

The sample of ectothermic vertebrates is not as rich as in Viktojev spodmol, though equally varied.

Fish remains include two scales, 9 vertebrae and 4 teeth.

Lizards are represented mainly with a large number of osteoscutes, which we also found in large numbers in the sample taken directly from the Mesolithic layer. The majority of dermal plates belong to slow worm (*Anguis fragilis*). It therefore raises the question of whether this is kitchen waste or natural death of slow worm.



Sl. 4. 1: Kožne ploščice slepca (*Anguis fragilis*). Foto F. Cimerman.
Fig. 4. 1: Dermal plates (osteoscutes) of slow worm (*Anguis fragilis*). Photo F. Cimerman.

5. Sesalska favna

5. Mammalian Fauna

Ivan Turk, Borut Toškan & Janez Dirjec

Sesalsko favno izkopavanj F. Lebna v M. Triglavci (mezolitski horizont) sta obdelala V. Pohar (1990) in I. Turk (neobjavljeno poročilo).

V. Pohar navaja 13 vrst, ki jim je po ponovnem pregledu deponije sedimentov treba dodati številne vrste malih sesalcev (skoraj celoten repertoar vrst iz Viktorjevega spodmola plus širokouhega netopirja (*Barbastella barbastellus*) in pet vrst velikih sesalcev (*Castor fiber, Capra s. Ovis, Ursus arctos, Canis familiaris* in *Felis catus*). Poleg novih vrst so bile v ponovno pregledani deponiji sedimentov ugotovljene tudi vse vrste s starega seznama razen poljskega zajca, marala in lisice.

Vrste so zastopane v enakem vrstnem redu kot na starem seznamu: največ je navadnega jelena, sledijo divja svinja, srna in jazbec. Prevladovanje navadnega jelena in divje svinje med ostanki makro favne je običajno za večino mezolitskih najdišč v pasu od Tržaškega zaliva do Atlantika.

Posebno pozornost zasluži najdba bobra, ki je imel domnevno domovanja ob reki Reki ali Glinščici in ki nekako ne sodi v današnjo kraško pokrajino.

Enako pozornost zaslužijo najdbe drobnice, ki prav tako ne sodijo v mezolitik (glej Rozoy 1978b, 299 za diskusijo na to temo). Za najdbe drobnice sta možni dve razlagi: ali da so v mezolitiku na Krasu imeli poleg psa tudi udomačene koze in/ali ovce, ali da je med mezolitsko in krovno neolitsko plastjo sedimentacijska vrzel (zastoj sedimentacije), zaradi česar so se mlajše najdbe delno pomešale s starejšimi. Zadnjo razlago podpirata skromna prisotnost najdb drobnice in keramike v mezolitskih plasteh in dejstvo, da te najdbe predstavljajo skoraj izključno izolirani zobje, majhne kosti in majhni odlomki keramike, ki bi se vsi lahko pogreznili v talnino v času nastanka krovne neolitske plasti, ki je bistveno bogatejša z najdbami keramike in drobnice. Vprašanje udomačenih živali v mezolitiku bi na lokalni ravni lahko rešila predvsem problemsko usmerjena sistematična izkopavanja v M. Triglavci. Viktorjev spodmol takšne rešitve ne ponuja zaradi diskordance med mezolitsko in prazgodovinsko plastjo.

Številu 370 določljivih živalskih ostankov s seznama V. Poharjeve (1990, razpr. 1) je treba dodati še **najmanj** 566 določljivih ostankov velikih sesalcev (brez majhnih fragmentov jelenjega rogovja, ki jih je vsaj

The mammalian fauna of the excavations of F. Leben in M. Triglavca (Mesolithic horizon) were dealt with by V. Pohar (1990) and I. Turk (unpublished report).

V. Pohar states 13 species, to which must be added a number of species of small mammal after re-examination of the deposits of sediment (almost the entire repertoire from Viktorjev spodmol plus barbastelle bat (*Barbastella barbastellus*) and five species of large mammal (*Castor fiber, Capra s. Ovis, Ursus arctos, Canis familiaris* and *Felis catus*). In addition to the new species in the re-examination of the deposits of sediments, all the species from the old list were found except hare, maral (*Cervus elaphus maral*) and fox.

The species are represented in the same order as in the old list: there is most red deer, followed by wild boar, roe deer and badger. The prevalence of red deer and wild boar among the remains of macrofauna is normal for the majority of Mesolithic sites in a belt from the Bay of Trieste to the Atlantic.

The find of beaver deserves special attention, who presumably inhabited the banks of the rivers Reka or Glinščica and certainly does not belong in today's karst landscape.

The finds of kine deserve the same attention, which similarly do not belong among the Mesolithic (see Rozoy 1978b, 299 for discussion on this theme). Two explanations are possible for the finds of kine: either they had, in addition to dogs, also domesticated goats and/or sheep in the Mesolithic on the Karst, or there was a sedimentation gap (pause in sedimentation) between the Mesolithic and covering Neolithic layer, because of which younger finds are partially mixed with older ones. The latter explanation is supported by the modest presence of finds of kine and pottery in Mesolithic layers and the fact that these finds represent almost exclusively isolated teeth, small bones and small fragments of pottery, which could all have sunk into the soil at the time of formation of the covering Neolithic layer, which is essentially richer in finds of pottery and kine. The question of domesticated animals in the Mesolithic could be solved on the local level mainly by problem oriented systematic excavations in M. Triglavca. Viktorjev spodmol does not offer such a solution because of the discordance between the Mesolithic and Prehistoric layers.

2.200!) z deponije sedimentov, kar pomeni, da so bili določljivi ostanki velikih sesalcev med 'sistematskimi' izkopavanji pobrani **bistveno manj** kot 40-odstotno, če upoštevamo tudi nepregledani del deponije. To pa je podatek, ob katerem bi se moral zamisliti vsak analitik in pisec sintez.

Fragmentarnost kostnih ostankov je izredna, saj skoraj ni celih kosti, tudi če upoštevamo tiste, ki so jih izločili med Lebnovimi izkopavanji.

Poleg določljivih ostankov je bilo v pregledani deponiji sedimentov izredno veliko nedoločljivih kostnih fragmentov, ki so večinoma manjši kot 1 cm. V frakciji sedimenta, večji od 3 mm, predstavljajo nedoločljivi fragmenti približno 6 % celotne mase sedimentne frakcije brez blokov. Težo vseh nedoločljivih fragmentov v pregledani deponiji ocenjujemo na 43 kg. Ta količina je vsekakor pomembna za **neposredno** določanje obsega užitega plena, ki se običajno določa **posredno** na podlagi določljivih ostankov in najmanjšega števila živali posameznih vrst.

Masno razmerje med določljivimi in nedoločljivimi fragmenti je 1:15, ali povedano drugače, določljivi fragmenti predstavljajo samo približno 6 % mase vseh fragmentov. Zato so določljivi fragmenti manj primerni za določanje količine konzumiranega plena kot nedoločljivi.

Veliko določljivih in nedoločljivih odlomkov kosti je ožganih, manj je kalciniranih in v ognju deformiranih odlomkov. Fragmenti kosti z vrezi in s sledovi grizenja so izredno redki, čeprav so veliko večino živalskih ostankov zapustili in fragmentirali ljudje in ne zveri.

Zanimivo je vprašanje, kako/zakaj so nastali vsi ti fragmenti, zlasti manjši od 1 cm, ki jih je največ. Na tem mestu bi se dotaknili le fragmentov jelenovega rogovja, ki edini ponujajo hiter odgovor na zastavljeno vprašanje. Pri kostnih fragmentih so stvari bolj zapletene in zahtevajo stratigrafske podatke, ki jih mi nimamo.

M. Triglavca je znana po večjem številu izdelkov iz jelenovega rogovja (Leben 1988). Če so bile v spodmolu obrtne delavnice za izdelke iz te surovine, je torej pričakovati veliko odpadkov (beri majhnih fragmentov) jelenovega rogovja,. V gradivu izkopavanj F. Lebna (plasti 8-10) je 16 % vseh določljivih najdb jelena pripadalo rogovju (Turk, neobjavljeno). Jelen je bil tudi glavna lovna divjad. Po ponovnem pregledu Lebnove deponije sedimentov se je delež najdb rogovja povzpel na 82 %.

V Viktorjevem spodmolu, kjer je bil jelen prav tako glavna lovna divjad, je bilo teh najdb samo 31 %.

Ker je v Viktorjevem spodmolu zelo malo izdelkov iz jelenovega rogovja, so razlike v deležih odpadkov pri enaki metodologiji zbiranja podatkov razumljive. Kolikor niso pogojene z nesorazmerjem med raziskanimi volumni in površinami, lahko rečemo, da je bila v M. Triglavci specializirana delavnica za izdelke iz jelenovega rogovja, v Viktorjevem spodmolu pa je bila takšna dejavnost postranskega pomena.

To the 370 identified animal remains in V. Pohar's list (1990, Table. 1) must be added **at least** 566 identified remains of large mammals (without small fragments of deer antler, of which there are at least 2,200!) from the deposits of sediments, which means that during 'systematic' excavations **essentially fewer** than 40 percent of identified remains of large mammals were collected, taking into account the unexamined part of the deposits. This is data that any analyst and writer of syntheses must consider.

The fragmentary nature of the bone remains is exceptional since there is almost no whole bone, even taking into account those retrieved during Leben's excavations.

In addition to the identified remains, there was an extremely large amount of unidentified bone fragments, for the most part less than 1 cm. In the fraction of sediment larger than 3 mm, unidentified fragments represent approximately 6% of the total mass of sediment of the fraction without blocks. We estimate the weight of all unidentified fragments in the examined deposits at 43 kg. This quantity is certainly important for the **direct** determination of the extent of game taken, which is normally determined **indirectly** on the basis of identified remains and the minimum number of animals of individual species.

The weight ratio between identified and unidentified fragments is 1:15, or put another way, identified fragments only represent approximately 6% of the weight of all fragments. So identified fragments are less suitable for determining the quantity of consumed prey than the unidentified.

A lot of the identified and unidentified fragments of bone have been burnt, there are fewer calcified and fire-deformed fragments. Fragments of bone with cuts or traces of biting are extremely rare, although the great majority of the animal remains have been abandoned and fragmented by people and not carnivores.

The question of how/why all these fragments were created is interesting, especially those smaller than 1 cm, of which there are the most. We would only touch here on fragments of deer antler, which is the only one that offers a fast answer to the question posed. With bone fragments matters are more complex and require stratigraphic data that we do not have.

M. Triglavca is known for the number of products made of deer antler (Leben 1988). If there was a 'craft shop' for making products from this raw material, a lot of waste (small fragments) of deer antler can be expected. In the material of the excavations of F. Leben (layers 8-10) 16% of all identified finds of red deer are from the antlers (Turk, unpublished). Deer was also the main game hunted. After re-examination of Leben's deposits of sediments, the share of finds of antler rose to 82%.

In Viktorjev spodmol, where red deer was similarly the main hunted animal, there were only 31% of these finds.

Ponoven pregled deponije sedimentov je prinesel nova znanja o favni malih sesalcev, ki je bila pred tem popolnoma neznana (Pohar 1990, razpredelnica 1). Ta favna sicer tu ni tako bogata, kot je bila v Viktorjevem spodmolu, kjer je bilo v petkrat manjšem volumnu sedimentov skoraj trikrat toliko določljivih ostankov, a se kljub temu dobro ujema z njo v vrstni sestavi.

Od 27 vrst malih sesalcev, katerih ostanke smo našli v mezolitskih režnjih Viktorjevega spodmola, sta namreč v vzorcu iz M. Triglavce manjkali le poljska rovka (*Crocidura leucodon*) in gozdna ali gorska rovka (ena od obeh vrst je bila zagotovo zastopana s fragmentom spodnje čeljustnice, ki pa ločevanja med *Sorex alpinus* in *S. araneus* ne dopušča). Prav tako so v vzorcu iz M. Triglavce manjkali ostanki vseh štirih v Viktorjevem spodmolu zastopanih vrst netopirjev, našli pa smo fragment zgornje čeljustnice širokouhega netopirja (*Barbastella barbastellus*). Sicer pa so najdbe poljske, gozdne in gorske rovke ter netopirjev izjemno redke tudi v vzorcu iz Viktorjevega spodmola, kjer skupaj predstavljajo komaj 1,1 % vseh določenih ostankov malih sesalcev.

Na tem mestu se v neposredne primerjave med številčnostjo ostankov posameznih taksonov v obeh najdiščih ne bomo spuščali. Smiselno pa se zdi opozoriti na veliko podobnost med vzorcem iz M. Triglavce in pa tistim iz mezolitskih režnjev Viktorjevega spodmola. V obeh primerih namreč prevladujejo ostanki na gozd vezanih vrst (polhi, rumenogrla miš, veverica, gozdna voluharica), kar kaže na domnevno prevladujočo vlogo mešanih in listnatih gozdov nad travniki in kamenišči v tistem obdobju. Prisotnost slednjih dokazujejo predvsem ostanki vrst rodu *Microtus*, navadne belonoge miši ter snežne voluharice. Skladni s tem so tudi izsledki palinoloških analiz za širše območje obeh najdišč (Culiberg 1995).

V splošni paleookoljski sliki pa kaže v povezavi z ostanki malih sesalcev iz M. Triglavce izpostaviti tudi prisotnost v ponovno pregledanem sedimentu sicer izjemno redkih najdb sivega hrčka (*Cricetulus migratorius*; NISP=3) in dinarske voluharice (*Dinaromys bogdanovi*; NISP=1). Obe vrsti sta namreč iz holocena Slovenije znani le še iz mezolitskih režnjev Viktorjevega spodmola, v primeru dinarske voluharice pa gre sploh za prve holocenske najdbe te vrste zunaj njenega današnjega območja razširjenosti (glej Toškan in Kryštufek, ta zbornik).

Since there were very few products from deer antler in Viktorjev spodmol the differences in the shares of debris with the same methodology of collecting data are understandable. Insofar as they are not conditioned by disproportions between the studied volumes and areas, we can say that there was a specialised workshop in M. Triglavca for deer antler products. And that in Viktorjev spodmol this activity was of subsidiary importance.

Re-examination of the deposits of sediments brought new knowledge of the small mammal fauna, which was completely unknown before this (Pohar 1990, Table 1). This fauna is not as rich as in Viktorjev spodmol, where there was almost three times as many identified remains in five times less volume of sediments, though otherwise corresponding well with it in terms of species composition.

Of 27 species of small mammal whose remains we found in the Mesolithic spits of Viktorjev spodmol, only bi-coloured white-toothed shrew (*Crocidura leucodon*) and common or alpine shrew (one of the two species was certainly represented with a fragment of lower jaw, but it was not possible to distinguish between *Sorex alpinus* and *S. araneus*) were lacking from M. Triglavca. Similarly all four species of bat found at Viktorjev spodmol are missing in the sample from M. Triglavca, though we found a fragment of upper jaw of barbastelle bat (*Barbastella barbastellus*). However, finds of bi-coloured, common and alpine shrew and bats were also extremely rare in the sample from Viktorjev spodmol, where all together they represent barely 1.1% of all identified remains of small mammals.

We will not go here into a direct comparison between the number of remains of individual taxons at the two sites. However, it seems sensible to highlight the great similarity between the sample from M. Triglavca and that from the Mesolithic spits of Viktorjev spodmol. In both cases, namely, the remains of forest bound species predominate (dormouse, yellow necked mouse, red squirrel, bank vole), which indicates the presumed prevailing role of mixed and deciduous forest over meadow and stonefields in this period. The presence of the latter is shown mainly by the remains of species of the *Microtus* genus, long tailed fieldmouse and snow vole. Results of palinological analyses for the wider region of the two sites (Culiberg 1995) are also in line with this.

In the general palaeoenvironmental picture, the presence in the rexamined sediments of otherwise extremely rare finds of grey hamster (*Cricetulus migratorius*; NISP=3) and Martino's vole (*Dinaromys bogdanovi*; NISP=1) should be highlighted in connection with the remains of small mammals from M. Triglavca. The two species, namely, are only known from the Holocene in Slovenia in the Mesolithic spits of Viktorjev spodmol, and in the case of Martino's vole it is the first find at all of this species outside its today's area of distribution (see Toškan and Kryštufek, this volume).

3. del / Part 3

Sklep / Conclusion

IVAN TURK

Viktorjev spodmol in M. Triglavca predstavljata trenutno najbogatejši in najbolj reperezentativni zbirki mezolitskega gradiva v Sloveniji. Reprezentativni predvsem zaradi načina, kako je bilo gradivo pridobljeno.

Najdišči sta nedvomno izjemno bogati, saj imata veliko gostoto vseh vrst najdb na volumensko enoto. Po gostoti najdb, med katerimi močno izstopajo kamniti artefakti in ostanki vseh vrst favn (mehkužci, plazilci, mali in veliki sesalci), se lahko primerjata z vsemi ključnimi mezolitskimi najdišči v Evropi (Grotta Azzura, Grotta dell'Edera, Riparo Gaban, Romagnano III, Montclus, Rouffignac, Montbani, Fontfaurès ...)

Najdišči sta bili raziskani z različnimi terenskimi metodami, rezultati teh metod pa so bili med seboj primerjani. Pri tem se je pokazalo, da dajejo stare standardne terenske metode, s katerimi je bila raziskana večina paleolitskih in mezolitskih najdišč v Sloveniji, najslabši rezultat.

Pri novih ('nadstandardnih') terenskih metodah ugotavljam pri najdbah dva gradienta. Prvi je povezan s skokovitim naraščanjem števila najdb, zlasti drobnih, kot posledico natančnejšega dela, drugi pa s skokovitim zmanjševanjem velikosti najdb oziroma prehodom iz makroskopske dimenzijoev mikroskopsko, zaradi izboljšav pri odkrivanju najdb. Slednje je razvidno na podlagi povprečne teže najdb. S to sem lahko ocenil, kako dobro je bilo moje delo izvedeno na terenu in pozneje v laboratoriju, vendar tega pri delu drugih ne nameravam početi.

Primerjava rezultatov različnih faz izkopavanja, v katerih so bile uporabljene različne tehnike in metode, jasno kaže, da je interpretacija najdišča, ki temelji na najdbah, močno odvisna od načina (in natančnosti) dela na terenu in pozneje v laboratoriju (prim. Payne 1972 b). Resnosti tega problema se zaveda odločno premalo ljudi v stroki.

Na tem mestu ne bom ponovno našteval vseh ugotovitev, povezanih z arheološkim gradivom, ampak samo nekaj najbistvenejših.

Mezolitska najdišča v zahodni Sloveniji (Viktorjev spodmol, M. Triglavca, Pod Črmukljo) so del sovterjensko-kastelnovjenske tradicije, ki jo odlikujejo nekatere posebnosti. Tako npr. so nepomembni mikrolitski seg-

Viktorjev spodmol and M. Triglavca are currently the richest and most representative collections of Mesolithic material in Slovenia; representative mainly because of the way the material was obtained.

The sites are certainly extremely rich, with a high density of all types of find per unit of volume. In terms of density of finds, among which stone artefacts and remains of all sorts of fauna (molluscs, reptiles, small and large mammals) stand out, they can be compared with any of the key sites in Europe (Grotta Azzura, Grotta dell'Edera, Riparo Gaban, Romagnano III, Montclus, Rouffignac, Montbani, Fontfaurès ...).

The sites were studied with different field methods, but the results of these methods were inter-comparable. It appeared in this that the old standard fieldwork methods by which the majority of Palaeolithic and Mesolithic sites in Slovenia were researched, gave the worst results.

The new ('above-standard') fieldwork methods produced two gradients with the finds. The first is the major increase in the number of finds, especially small ones, as a result of the more precise work, and the other is the major reduction in the size of the finds or the transition from macroscopic to microscopic dimensions, because of improvements in discovering finds. The latter is evident on the basis of the average weight of finds. I could decide in this way how well my work was performed in the field and later in the laboratory, although I do not intend to do this with the work of others.

Comparison of the results of the various phases of excavations in which different techniques and methods were used clearly show that the interpretation of a site based on finds depends greatly on the method (and accuracy) of work in the field and later in the laboratory (see Payne 1972 b). Far too few people in the profession are aware of the reality of this problem.

I will not enumerate here all the findings connected with archaeological material, only some of the most essential.

Mesolithic sites in western Slovenia (Viktorjev spodmol, M. Triglavca, Pod Črmukljo) are part of the Sauveterrian-Castelnovian tradition, which is distinguished by two particularities. Microlithic segments typical menti, značilni za starejšo mezolitsko fazo (sovterjen). Trikotniki so na splošno manj pogosti kot v najdiščih sovterjensko-kastelnovjenskega kompleksa, klinice s hrbtom in prečno retušo so skoraj vse z redkimi izjemami atipične. Po drugi strani pa se pojavljajo npr. pecljata mikrolitska orodja, ki drugje niso znana.

Temeljno vprašanje, ki v Sloveniji ni rešeno je, kako ločiti sovterjen od kastelnovjena oz. starejši mezolitik od mlajšega pri najdiščih brez izrazitega sosledja plasti z mezolitskimi najdbami.

Ena od možnosti, ki jo uporabljajo vsi, je kronometrija. Vendar se mi ta možnost zaradi nezanesljivosti radiometrično določenih starosti in nevarnosti krožnega argumentiranja ne zdi najprimernejša. Zato bo treba najti nove načine za koreliranje najdišč oziroma kombinirati različne stare in nove možnosti za kronološke korelacije.

Trapezi so tiste geometrične armature, ki običajno služijo za ločevanje sovterjena od kastelnovjena v pasu južno in jugozahodno od Alp, tj. od Tržaškega zaliva do atlantske obale. Na tem prostoru naj bi se pojavili nekako sočasno, in sicer na prehodu 9. tisočletja v 8. pred sedanjostjo (9/8 ky BP).

Glede na število trapezov v starejšem in mlajšem kastelnovjenskem nivoju najdišča R. Gaban (Kozłowski, Dalmeri 2000) bi Viktorjev spodmol lahko uvrstil v starejšo fazo kastelnovjena, M. Triglavco pa v njegovo mlajšo fazo pod pogojem, da trapezi v M. Triglavci ne pripadajo krovni neolitski plasti oziroma neolitiku (za stratigrafijo glej Leben 1988) S takšno umestitvijo se ujema tudi število mikro vbadal, preračunano na število trapezov v obeh najdiščih. V kastelnovjen lahko na podlagi najdenih trapezov in mikro vbadal uvrstim tudi najdišče Pod Črmukljo (Brodar 1992).

Odprto ostaja vprašanje umestitve najdišča na Bregu, ki ga je Frelih (1986) opredelil kot kastelnovjensko. To najdišče po trapezih, ki niso bili izdelani z mikrovbadalno tehniko, močno odstopa od skupine sovterjensko-kastelnovjenskih najdišč v zahodni Sloveniji. Na Bregu tudi ni bilo najdeno nobeno mikro vbadalo. Podrobna primerjalna analiza Brega z najdišči v zahodni Sloveniji bi pokazala še več razlik, predvsem v uporabi surovin nelokalnega izvora in obliki praskal, kar vse še sodi v kategorijo primerljivih spremenljivk.

Klinica s hrbtom in prečno retušo ima v inventarju M. Triglavce prav tako pomembno vlogo kot v Viktorjevem spodmolu. Večina primerkov ni tipična, vendar to ni posledica sloga oz. njegove slabe kopije, sicer ne bi bilo tudi tipičnih kosov.

Trikotnikov je v M. Triglavci relativno manj kot v Viktorjevem spodmolu, kar je razvidno iz razmerja trikotniki/trapezi, ki je v M. Triglavci 0,4, v Viktorjevem spodmolu pa 2,5.

Izhajajoč iz ugotovitev italijanskih kolegov, da sta za razvoj mezolitika značilna porast trapezov in upad enakokrakih trikotnikov, je zanimivo tudi razmerje ena-

of the earlier Mesolithic phase (Sauveterrian) are unimportant. Triangles are generally less frequent than in sites of the Sauveterrian-Castelnovian complex, and truncated backed bladelets, with few exceptions, are almost all atypical. On the other hand, stemmed microlithic tools appear that are unknown elsewhere.

The basic question that is not resolved in Slovenia is how to distinguish Sauveterrian from Castelnovian, or the early Mesolithic from the later, with sites without well-defined stratigraphy of Mesolithic finds.

One of the methods everybody uses is chronometry. However, because of the unreliability of radiometrically determined age and the risk of circular argument, it does not seem to me appropriate. New methods must be found of correlating sites or combining old and new possibilities of chronological correlation.

Trapezes are geometric armatures which normally serve for distinguishing Sauveterrian from Castelnovian in the belt south and southwest of the Alps, i.e., from the Bay of Trieste to the Atlantic coast. They appeared in this space fairly contemporaneously, at the turn of the 9th to the 8th millennium (9/8 ky BP).

In view of the number of trapezes in the late and early Castelnovian level of the R. Gaban site (Kozłowski, Dalmeri 2000), I could place Viktorjev spodmol in the older phase of the Castelnovian, and M. Triglavca in its later phase, provided that the trapezes in M. Triglavca do not belong to the covering Neolithic layer or the Neolithic (for stratigraphy, see Leben 1988) Such a classification also corresponds to the number of microburins, calculated as a ratio of the number of trapezes at the two sites. On the basis of trapezes and microburins, I can also place the Pod Črmukljo site in the Castelnovian (Brodar 1992).

The question of the classification of the site at Breg remains open. Frelih (1986) defined it as Castelnovian. In terms of trapezes that were not made with the microburin technique, it greatly deviates from the group of Sauveterrian-Castelnovian sites in western Slovenia. No microburins were found at Breg, either. Detailed comparative analysis of Breg with sites in western Slovenia would show further differences, mainly in the use of raw materials of non-local origin and the shape of endscrapers, all of which belong in the category of comparative variables.

Truncated backed bladelets have a similarly important role in M. Triglavca as in Viktorjev spodmol. The majority of specimens are not typical, but this is not a result of style or its poor copy, or there would not also be typical pieces.

There are fewer triangles in M. Triglavca than in Viktorjev spodmol, as is clear from the triangle/trapeze ratio, which is 0.4 in M. Triglavca and 2.5 in Viktorjev spodmol.

Based on the findings of Italian colleagues that an increase in trapezes and decrease in isosceles triangles kokraki trikotniki/trapezi. To razmerje je v M. Triglavci 0,1 in v Viktorjevem spodmolu 0,25.

Če razlike v enih in drugih razmerjih razložim kronološko, so najdbe v Viktorjevem spodmolu, za katere so značilni relativno številni trikotniki in relativno maloštevilni trapezi, starejše od najdb v M. Triglavci, za katero je značilno ravno obratno.

Tipometrična analiza trapezov, trikotnikov in klinic s hrbtom ter prečno retušo je pokazala, da so različne oblike geometričnih armatur vezne, ali drugače povedano, da ena oblika iste aramture vezno preide v drugo. Podobno so drugi ugotovili s statistično analizo na veliko večjem vzorcu mezolitskih armatur (Barbaza *et al.* 1991).

Viktorjev spodmol in M. Triglavca sta pomembna tudi kot bogat vir podatkov o nekdanjem okolju, saj so bile prav tu prvič zbrane in sistematično obdelane nekatere zvrsti teh podatkov za mezolitska najdišča v Sloveniji.

Analiza razpršenega oglja, najdenega v mezolitskem horizontu Viktorjevega spodmola, dopušča sklep o obstoju mešanega hrastovega gozda, ki je po mezolitiku prešel v močno presvetljen degradiran gozd zaraščajočih pašnikov. O bukvi ni sledu. Hrastov gozd je mogoče postaviti na začetek ali konec zgodnjega holocena.

Analiza različnih favn je pokazala, da sta tako Viktorjev spodmol kot M. Triglavca zelo bogata z vrstami, ki se dajo zanesljivo umestiti v zgodnji holocen.

V Viktorjevem spodmolu je bilo na površini 2 m^2 najdenih 23.984 ostankov favne. Od tega 6.076 določljivih, ki pripadajo 14 vrstam velikih sesalcev (brez človeka), 30 vrstam malih sesalcev, 13 vrstam mrzlokrvnih vretenčarjev in 47 vrstam mehkužcev. Nič manj bogata ni favna M. Triglavce, ki še čaka na obdelavo.

Za kopenske polže v Viktorjevem spodmolu je značilen velik delež mediteranskih in južnoevropskih vrst v širšem smislu. Vse najdene vrste še danes živijo na širšem območju najdišča. Vrstno najbogatejši je mezolitski horizont, kjer je bilo najdenih 15 do 27 vrst na reženj ali na 0,0016 m^3 sedimenta. Med njimi je presenetljivo tudi precej pogosta vrsta *S. fluminensis*, ki je neposredno vezana na vodni habitat.

Veliki vrtni polž, ki je v obeh najdiščih zastopan z izredno veliko količino ostankov, je lahko služil ljudem kot vir hrane.

Na povezanost kraških mezolitskih prebivalcev z morjem kažejo številni ostanki različnih vrst morskih školjk in polžev.

Med ostanki ektotermnih vretenčarjev v Viktorjevem spodmolu in M. Triglavci močno prevladujejo ostanki slepcev (Anguidae). Slepci so domnevno avtohton element v fosilni združbi Viktorjevega spodmola in kažejo, da so v bližini obstajali dalj časa vlažni travniki in gozd. Ostanki vseh drugih ektotermnih vretenčarjev (rib, močeradov, kač in kuščarjev) so alohtoni elementi in predstavljajo ostanke plena ujed in/ali drugih plenil-

are typical of the development of the Mesolithic, the ratio between isosceles triangles and trapezes is also interesting. This ratio is 0.4 in M. Triglavca and 0.25 in Viktorjev spodmol.

If differences between them are explained chronologically, the finds in Viktorjev spodmol for which relatively numerous triangles and relatively few trapezes are characteristic, are older than the finds in M. Triglavca, for which the reverse is true.

Typometric analysis of trapezes, triangles and truncated backed bladelets showed that the various shapes of geometric bladelets are continuous, or put another way that one shape of the same armature always flows into another. Others have found the same with statistical analysis of much larger samples of Mesolithic armatures (Barbaza *et al.* 1991).

Viktorjev spodmol and M. Triglavca are also important as a rich source of data on the former environment, since certain types of such data for Mesolithic sites in Slovenia were collected and systematically processed here for the first time.

Analysis of dispersed charcoal found in the Mesolithic horizons of Viktorjev spodmol allows the conclusion of the existence of mixed oak forest, which transformed after the Mesolithic into much lighter, degraded forest of encroaching pastures. There is no trace of beech. It is possible to place the oak forest at the start or end of the Early Holocene.

Analysis of the various fauna showed both Viktorjev spodmol and M. Triglavca to be very species rich, which places them firmly in the Early Holocene.

In Viktorjev spodmol, on area of 2 m^2, 23,984 remains of fauna were found. Of this, 6,076 were identified and belong to 14 species of large mammal (without man), 30 species of small mammal, 13 species of cold-blooded vertebrates and 47 species of mollusc. The fauna of M. Triglavca is no less rich, but awaits processing.

Land snails in Vikrojev spodmol are characterised by a large share of Mediterranean and southern European species in the wider sense. All the species found still inhabit the wider vicinity of the site today. The Mesolithic horizon is the species richest, where 15 to 27 species per spit, or in 0.0016 m^3 of sediment, were found. Surprisingly, they included fairly frequent specimens of *S. fluminensis*, which is directly bound to a water habitat.

The large garden snail, which may have been a source of food for people, is in large quantities at both sites.

The numerous remains of various species of sea shells and snails indicate a link between the Karst Mesolithic inhabitants and the sea.

Among the remains of ectothermic vertebrates in Viktorjev spodmol and M. Triglavca, the remains of slow worm (Anguidae) strongly stand out. Slow worms are presumably an autochthonous element in the fossil ascev, v določenih primerih (npr. ostanki rib) tudi človeka.

Na podlagi ostankov malih sesalcev, kot so *T. europea*, *T. caeca* in nekateri netopirji, sklepamo, da je bila klima v zahodni Sloveniji v obdobju mezolitika (delu zgodnjega holocena) mila in je pogojevala prevlado listnatih oziroma mešanih gozdov, ki jih nakazujejo ostanki vrst, kot so *G. glis*, *M. avellanarius*, *A. flavicollis*, *S. vulgaris*, nad domnevno prostorsko omejenimi travniki in kamnišči, ki jih nakazujejo npr. ostanki *M. agrestis*, *M. arvalis*, *Ch. Nivalis*. Podobno sliko kažejo tudi izsledki palinoloških raziskav (vrtina Škocjanski zatok; Culiberg 1995).

Najdbe sivega hrčka (*C. migratorius*) v Viktorjevem spodmolu in M. Triglavci so prve holocenske najdbe te vrste v Sloveniji, medtem ko so ostanki dinarske voluharice (*D. bogdanovi*) v obeh najdiščih sploh edini doslej znani ostanki te vrste zunaj njenega recentnega območja razširjenosti.

Na podlagi ostankov velikih sesalcev je bilo ugotovljeno naslednje:

Poglavitni vir mesa in maščob za mezolitske skupnosti v Viktorjevem spodmolu in M. Triglavci sta bila jelen in divji prašič, kar je značilno za večino mezolitskih najdišč od Tržaškega zaliva do Atlantika (Rozoy 1978b). Najdbe obeh vrst in še nekaterih drugih, kot sta npr. *F. silvestris* in *M. meles*, dodatno potrjujejo pomembno vlogo listnatih oziroma mešanih gozdov v tem delu Slovenije v določenih obdobjih zgodnjega holocena.

Pomen maščob za mezolitske skupnosti domnevno potrjuje obstoj velikega števila majhnih kostnih fragmentov (pod 10 mm), ki naj bi jih proizvedel človek, manj bi bili ti fragmenti posledica preperevanja, saj so kosti kot take v obeh najdiščih odlično ohranjene. Vsekakor bi bil za proučitev vprašanja nastanka majhnih kostnih odlomkov potreben sistematičen nabor podatkov iz različnih arheoloških in nearheoloških kontekstov.

Kar zadeva domače živali, je za mezolitske režnje v obeh najdiščih potrjena le prisotnost psa. Na podlgi zbranih podatkov in okoliščin najdb je razprava o domestikaciji drugih živali vsaj v M. Triglavci za zdaj preuranjena.

sociation of Viktorjev spodmol and show that for an extended period there were damp meadows and forest in the vicinity. The remains of other ectothermic vertebrates (fish, salamanders, snakes and lizards) are alochthonous elements and represent the remains of birds of prey and/or other predators, to a certain extent also man (e.g., the remains of fish).

On the basis of the remains of small mammals, such as *T. europea*, or *T. caeca*, and certain bats, we conclude that the climate in western Slovenia in the period of the Mesolithic (part of the Early Holocene) was mild and conditioned the prevalence of broadleaf or mixed forest, indicated by the remains of species such as *G. glis*, *M. avellanarius*, *A. flavicollis* or *S. vulgaris*, over presumably spatially limited meadows and stonefields, indicated by the remains of *M. agrestis*, *M. arvalis* or *Ch. nivalis*. The results of palinological research show a similar picture (Škocjanski zatok borehole; Culiberg 1995).

The finds of *C. migratorius* in Viktorjev spodmol and M. Triglavca are the first Holocene finds of these species in Slovenia, while the remains of Martino's vole (*D. bogdanovi*) at both sites are the only known remains of this species known to date outside its recent area of distribution.

The following was concluded on the basis of the remains of large mammals:

The main sources of meat and fat for the Mesolithic community in Viktorjev spodmol and M. Triglavca were red deer and wild boar, which is characteristic of the majority of Mesolithic sites from the Bay of Trieste to the Atlantic (Rozoy 1978b). The finds of both species and some others, such as *F. silvestris* and *M. meles*, additionally confirm the important role of broadleaf or mixed forest in this part of Slovenia at certain periods of the Early Holocene.

The importance of fat for the Mesolithic community seems to be confirmed by the existence of large numbers of small bone fragments (under 10 mm), that were presumably man made, fewer of these fragments would have been the result of weathering, since bones like this are excellently preserved at both sites. Certainly for a study of the question of the origin of small bone fragments, a systematic collection of data from various archaeological and non-archaeological contexts is needed.

In relation to domestic animals, only the presence of dog is confirmed for the Mesolithic spits of both sites. On the basis of collected data and the circumstances of the finds, it is clearly still too early for discussion on the domestication of other animals, at least at M. Triglavca.

4. del / Part 4

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Dodatek 1 / Annex 1

Identifikacija dveh človeških mlečnih sekalcev iz arheoloških najdišč Mala Triglavca in Viktorjev spodmol

Identification of Two Human Deciduous Incisors Excavated From Archaeological Sites in Mala Triglavca and Viktorjev Spodmol

Iztok Štamfelj[1], Erika Cvetko[2], Maja Bitenc-Ovsenik[3], Dominik Gašperšič[1]

Izvleček

Izhodišče in namen: Človeški zobje so zaradi velike obstojnosti pogosta najdba arheoloških izkopavanj. Namen študije je bil na osnovi oblikovnih, merskih in rentgenoloških lastnosti identificirati dva domnevno človeška zoba iz predzgodovinskega obdobja. **Gradivo in način dela:** Zoba sta bila izkopana v arheoloških najdiščih Mala Triglavca in Viktorjev spodmol (Podjamca) v jugozahodni Sloveniji in izvirata iz mezolitskih plasti (približno 4000–8000 pr. n. št.). Njune oblikovne, merske in rentgenološke lastnosti smo primerjali z lastnostmi mlečnih sekalcev današnjih slovenskih otrok na 50 mavčnih modelih in 20 izdrtih mlečnih sekalcih. **Ugotovitve:** Izkopana zoba ustrezata človeškim mlečnim sekalcem. Zob iz Male Triglavce je zgornji levi sekalec, najverjetneje drugi. Zob iz Viktorjevega spodmola je spodnji levi sekalec; glede na zobne mere ustreza prvemu sekalcu, po nekaterih oblikovnih lastnostih pa drugemu. Zgornji sekalec iz Male Triglavce najverjetneje ni izpadel spontano za časa življenja, temveč po smrti. Pri izpadu spodnjega sekalca iz Viktorjevega spodmola je bila verjetno potrebna pomoč drugega človeka ali pa je bil izgubljen po smrti. Na osnovi razjedenosti zobnih korenin domnevamo, da je bil otrok iz Male Triglavce star 5–9 let, otrok iz Viktorjevega spodmola pa 4–9 let.

Ključne besede: ugotavljanje zob, oblikovne in merske značilnosti mlečnih sekalcev, mlečni sekalci iz mezolitika, koreninska razjeda mlečnih zob

Abstract

Background and purpose: Human teeth are due to their good preservation over large time spans frequent findings of archaeological excavations. The aim of our work was the identification of two presumably human teeth on the basis of their morphological characteristics, dental measurements, and radiographic characteristics. **Material and Methods:** The teeth were excavated in archaeological sites Mala Triglavca and Viktorjev Spodmol (Podjamca) in the southwestern part of Slovenia. They originate from Mesolithic levels (around 4000–8000 BC). We compared their morphological, metrical, and rentgenographic characteristics with characteristics of deciduous incisors from 50 dental casts and 20 extracted teeth of contemporary Slovenian children. **Conclusion:** Excavated teeth correspond to human primary incisors. The tooth excavated in Mala Triglavca is the upper left, most probably second incisor. The tooth excavated in Viktorjev Spodmol (Podjamca) is the lower left incisor; according to dental measures it corresponds to the first incisor, according to some morphological characteristics it coresponds to the second incisor. The upper incisor from Mala Triglavca most probably was not lost spontaneously during the lifetime but after death of the child. For the loss of the lower incisor from Viktorjev Spodmol probably the help of some other person was needed or it was lost after death. From the root resorption we assume that the child from Mala Triglavca was 5–9 years old and the child from Viktorjev spodmol 4–9 years old.

Key words: teeth determination, morphological and metrical characteristics of deciduous incisors, mesolithic deciduous incisors, physiological root resorption.

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1 Uvod

Zobje so zaradi obstojnosti dragocen vir podatkov o demografskih in bioloških lastnostih, zdravju, prehrani in načinu življenja preteklih ljudstev. Pri pridobivanju teh podatkov so zobje kot gradivo pomembno dopolnilo ali vsaj enakovredni kostem, imajo pa v primerjavi z njimi nekaj prednosti. Oblikovne lastnosti zob so v večji meri dedno določene kakor značilnosti skeleta (Bailey, 2002). Ker se v nasprotju s kostnino trda zobna tkiva po končanem razvoju ne prenavljajo več, se oblikovne lastnosti zoba skozi življenje spreminjajo le zaradi bolezenskih sprememb (npr. zobna gniloba, resorpcija), s starostjo povezanih procesov (npr. obraba) in poškodb. Zaradi visoke vsebnosti mineralov so zobje zelo odporni na posmrtno razgradnjo. V gradivu, dobljenem pri arheoloških izkopavanjih, so na splošno bolje ohranjeni kakor kosti. Pogosto so edino, kar se po več tisočletjih ohrani. Pomemben kazalec splošnega zdravja ljudi so tudi razvojne napake sklenine. Iz razvitosti zobovja lahko najnatančneje določimo starost ob smrti pri skeletnih ostankih otrok (Saunders, 1992).

V naši študiji smo preučili dva domnevno človeška zoba iz predzgodovinskega obdobja, ki so ju našli pri arheoloških izkopavanjih. Namen študije je bil identificirati zoba na osnovi njunih oblikovnih, merskih in rentgenoloških lastnosti.

2 Gradivo in način dela

2.1 GRADIVO

Analizirali smo dva zoba, ki domnevno izvirata iz obdobja mezolitika (približno 4.000-8.000 pr. n. š.). Izkopana sta bila v arheoloških najdiščih Mala Triglavca blizu kraja Lokev in Viktorjev spodmol (Podjamca) pod Vremščico v jugozahodni Sloveniji (glej Štamfelj, Turk, ta zbornik). Njune oblikovne lastnosti in mere smo primerjali z lastnostmi in merami mlečnih zob na 50 mavčnih modelih današnjih slovenskih otrok, starih od 5 do 8 let (gradivo Katedre za zobno in čeljustno ortopedijo Medicinske fakultete v Ljubljani). Za primerjavo je služilo tudi 20 izdrtih človeških mlečnih sekalcev današnjih slovenskih otrok (zobna zbirka Katedre za zobne bolezni in normalno morfologijo zobnega organa Medicinske fakultete v Ljubljani).

2.2 OBLIKOVNE LASTNOSTI

Izkopana zoba in izdrte mlečne zobe današnjih otrok smo opazovali s stereoskopskim mikroskopom (Olympus B061, Japonska), mavčne modele z ročno lupo z 10-kratno povečavo. Na zobni kroni izkopanih sekalcev smo določili lego zobnega ekvatorja labialno in palatinalno,

1 Introduction

Teeth are due to their durability a valuable source of evidence in understanding demography, biological affinities, health, diet, and general way of life of past populations. In obtaining these data teeth perform better or at least as well as the bony remains of the skeleton, they even have several advantages. Morphological characteristics of teeth are controlled to a greater extent by genes than are skeletal features (Bailey, 2002). Contrary to bone tissue, hard dental tissues do not remodel once they have formed, so dental morphology changes throughout the life only as result of pathological changes (ie. caries, resorption), age-related processes (ie. wear), and trauma. Due to high mineral content teeth are very resistant to postmortal degradation. They are generally better preserved than bones in archaeologically-derived human remains. Often only teeth are preserved after thousands of years of burial in the ground. Developmental defects of enamel are also an important indicator of general health of people. The most accurate methods for determining age at death for skeletal remains of children are on the basis of teeth development (Saunders, 1992).

In our study we investigated two presumably human teeth from prehistoric times found during archaeological excavations. The aim of the study was to identify these teeth on the basis of their morphological, metrical, and rentgenographic characteristics.

2 Material and Methods

2.1 MATERIAL

We analyzed two teeth dating from the Mesolithic (around 4000-8000 BC) excavated in the southwestern part of Slovenia in Mala Triglavca near the town Lokev and in Viktorjev Spodmol (Podjamca) located below the mountain of Vremščica. Their morphological and metrical characteristics were compared with those of deciduous teeth on 50 dental casts of contemporary Slovenian children aged 5-8 years (material collected by the Department of Orthodontics, Medical Faculty, Ljubljana). For comparison we also used 20 extracted human deciduous incisors of contemporary Slovenian children (dental collection of the Department of Conservative Dentistry, Medical Faculty, Ljubljana).

2.2 MORPHOLOGICAL CHARACTERISTICS

Excavated teeth and extracted deciduous teeth of contemporary Slovenian children were observed with stereomicroscope (Olympus B061, Japan), dental casts were observed using hand lens with 10x magnification. On the crown of the excavated incisors the following features were značilnost krivulje, značilnost kota, lego zobnega tuberkla, prisotnost in izraženost obrobnih grebenov, potek skleninsko-cementne meje, prisotnost in lastnosti aproksimalnih atricijskih faset, obrabljenost griznega roba in barvo. Ugotavljali smo obliko prečnega prereza korenine in koreninskega kanala ter barvo korenine. Pri mlečnih sekalcih na mavčnih modelih smo ugotavljali značilnost krivulje, značilnost kota in lego zobnega tuberkla. Na izdrtih mlečnih sekalcih smo ugotavljali potek skleninsko-cementne meje, prisotnost aproksimalnih atricijskih faset in obrabljenost griznega roba.

2. 3 ZOBNE MERE

Zobe smo izmerili s kljunastim merilom (Zürcher modell, Dentaurum 042-751, Nemčija) z natančnostjo 0,1 mm. Na izkopanih zobeh smo izmerili širino (meziodistalni premer), debelino (labio-lingvalni premer) in dolžino (cerviko-incizalni premer) zobne krone, širino in debelino korenine na zobnem vratu ter njeno dolžino. Širino zobne krone smo merili med kontaktnima točkama, njeno dolžino med najbolj apikalno točko skleninsko-cementne meje na labialni ploskvi in griznim robom ter njeno debelino kot največjo razdaljo med labialno in lingvalno ploskvijo zobne krone.

Na mavčnih modelih smo izmerili širino in debelino zobne krone mlečnih sekalcev, močno obrabljene in poškodovane zobe smo izvzeli. Povprečno vrednost in standardni odklon meritev smo izračunali za desne sekalce, v primerih, ko desni sekalec ni bil merljiv, smo upoštevali meritev na istoimenskem levem sekalcu.

2. 4 RENTGENSKA ANALIZA

Rentgenske posnetke izkopanih zob smo napravili v labio-lingvalni in mezio-distalni smeri (rentgenski aparat: Planmeca Prostyle Intra; film: Kodak Dental Intraoral E-speed W2, 31 x 41 mm). Za primerjavo smo na enak način naredili rentgenske posnetke štirih zgornjih izdrtih mlečnih sekalcev in enega spodnjega.

Izkopana zoba smo fotografirali z digitalnim fotoaparatom (Nikon Coolpix 4500, Japonska).

3 Izidi

3. 1 ZOB IZ MALE TRIGLAVCE

Oblikovne lastnosti zobne krone

Zobna krona je bila dobro ohranjena (sl. 1 a-b). Obraba griznega roba je bila zmerna - 3. stopnja po Molnarjevi razvrstitvi (Hillson, 1998). Dentin je bil razgaljen vzdolž griznega roba v obliki črte, ki se je ožila v distal-

determined: location of the height of contour on labial and palatal surface, mesio-distal convexity of labial surface, characteristics of mesioincisal and distoincisal angles, position of dental tubercle, presence and expression of marginal ridges, course of cervical enamel line, presence and characteristics of approximal wear facetes, wear of incisal edge, and colour. The shape of root and root canal cross-section and root colour were observed. At deciduous incisors from dental casts mesio-distal convexity of labial surface, characteristics of mesioincisal and distoincisal angles, and position of dental tubercle were determined. On extracted incisors the course of cervical enamel line, presence of approximal wear facets, and wear of incisal edge were determined.

2. 3 DENTAL MEASUREMENTS

Teeth were measured with a sliding calliper (Zürcher modell, Dentaurum 042-751, Germany) with precision of 0.1 mm. On excavated teeth we measured width (mesio-distal diameter), breadth (labio-lingual diameter) and length (cervico-incisal diameter) of tooth crown. Additionally, cervical width and breadth of the root and root length were measured. Width of the tooth crown was measured between the contact points, length of the tooth crown was measured labially between the most apical point of cervical enamel line and incisal edge. Crown breadth was measured as the largest distance between labial and lingual surface of the crown.

On dental casts crown width and breadth of deciduous incisors were measured, teeth with extensive wear and damaged teeth were excluded. The mean and standard deviation of measurements were calculated for the right incisors. In the case when the right incisor could not be measured we took measurement on the contralateral (left) incisor.

2. 4 RENTGENOGRAPHIC ANALYSIS

Dental radiographs of excavated teeth were taken in labiolingual and mesiodistal direction (x-ray machine: Planmeca Prostyle Intra; film: Kodak Dental Intraoral E-speed W2, 31 x 41 mm). For comparison radiographs of four upper and one lower extracted incisors were taken at the same conditions.

Excavated teeth were photographed with digital camera (Nikon Coolpix 4500, Japan).

3 Results

3. 1 TOOTH FROM MALA TRIGLAVCA

Morphological characteristics of the crown

The crown of the tooth was well preserved (Figs. 1a and ni smeri. Grizni rob je bil debel 1,4 mm labio-palatinalno in je bil nekoliko labialno od vzdolžne osi zobne korenine (sl. 1 c–d). Distalni del griznega roba je zavijal nekoliko palatinalno (sl. 1 e).

Kot med mezialno aproksimalno ploskvijo in grizním robom je bil oster, prehod med grizním robom in distalno aproksimalno ploskvijo pa izrazito zaokrožen, kar označujemo kot značilnost kota (sl. 1 a–b). Z labialne smeri je bilo videti, da je grizni rob v mezialnem delu nekoliko vbočen. V vratni polovici je bila labialna ploskev izrazito izbočena v mezio-distalni smeri. Mezialno je bila izbočena bolj kakor distalno, kar označujemo kot normalno značilnost krivulje (sl. 1 e). Na palatinalni ploskvi je bil prisoten distalni obrobni greben, njena mezialna polovica pa je bila ravna, tako da je bila palatinalna vdolbina prisotna samo v distalnem delu ploskve. Zobni tuberkel je bil dobro razvit, gladek in je ležal nekoliko distalno od vzdolžne osi zoba (sl. 1 e). Zobna krona je bila v vratni tretjini zelo izbočena - cingulum basale (sl. 1 c–d).

Mezialna aproksimalna ploskev je bila ravna in skoraj navpična, distalna pa izbočena in bolj poševna (sl. 1 a–b). Na mezialni ploskvi je bila blizu griznega roba prisotna faseta, ki je najverjetneje nastala zaradi aproksimalne atricije. Na distalni ploskvi ni bilo značilne atricijske fasete, marveč je bila v incizalni polovici distalne in delu labialne ploskve ovalna vboklina s cerviko-incizalnim premerom 2,5 mm, labio-palatinalnim premerom 1,5 mm in globino 0,25 mm (sl. 1 a, d). Vdolbina se je na labialni ploskvi nadaljevala v trikotno faseto dolžine 1 mm. Površina vbokline je bila pri 40-kratni povečavi videti bolj hrapava kakor površina mezialne atricijske fasete in trikotne fasete, v katero se je vboklina nadaljevala na labialni ploskvi.

Makroskopsko je bil potek skleninsko-cementne meje dobro viden na vseh zobnih ploskvah (sl. 1 a–d). Višina mezialnega loka skleninsko-cementne meje je bila za 0,6 mm večja od višine distalnega (sl. 1 c–d). Na palatinalni ploskvi je potekala skleninsko-cementna meja 0,4 mm bolj apikalno kakor na labialni. Mikroskopski potek skleninsko-cementne meje je bil na labialni, palatinalni in mezialni ploskvi gladek, na distalni pa valovit.

Zobna krona je bila rjavosive barve. V sklenini so bile številne navpično potekajoče poke, zlasti na labialni in palatinalni ploskvi. Na palatinalni ploskvi in na sredini mezialne so bile prisotne trde obloge. Obloge so na palatinalni ploskvi tvorile pas, ki je pokrival mezialno tretjino ploskve in manjši otoček v predelu palatinalne vdolbine. Njihova lega in makroskopski videz nista bila značilna za zobni kamen. Zobni kamen se običajno nalaga na sklenini vratnega dela zobne krone v obliki pasu, ki posnema potek roba dlesne.

Površina zobne krone (sklenine) je bila gladka razen plitke, poševno potekajoče in nekaj milimetrov dolge brazde z nazobčanimi robovi v srednji tretjini labialne ploskve (sl. 1 a).

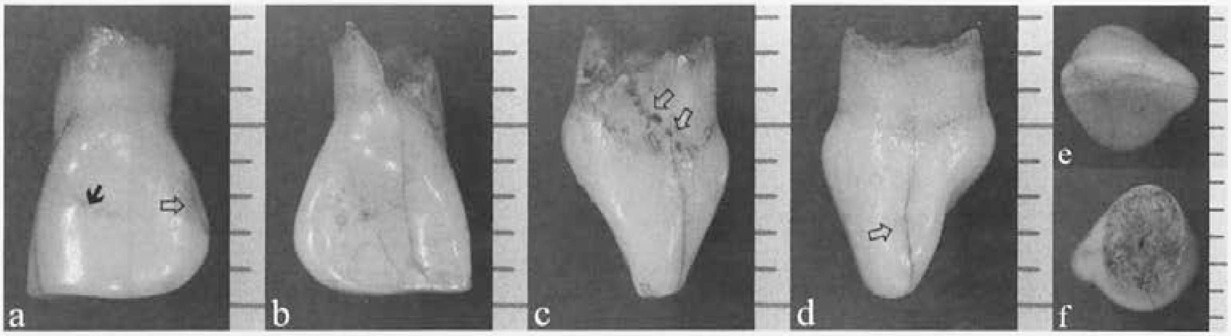
1 b). Wear of incisal edge was moderate - 3rd degree according to the Molnar's scoring system (Hillson, 1998). Dentine was exposed along the lenght of the incisal edge in the form of a line which narrows in the distal direction. The incisal edge was 1.4 mm thick labiopalatally and was slightly labial from the longitudinal axis of the root (Figs. 1 c–d). Distal part of the incisal edge was curved slightly palatally (Fig. 1 e).

The angle between mesial approximal surface and incisal edge was sharp, transition of incisal edge to distal approximal surface was pronouncely rounded (Figs. 1 a–b). From the labial aspect the incisal edge was slightly concave in its mesial portion. In the cervical half the labial surface was extremely convex in the mesiodistal direction. It was more convex mesially than distally (Fig. 1 e). On the palatal surface the distal marginal ridge was present, mesial half of the palatal surface was flat so that the palatal fossa was present only in the distal part of the surface. Dental tubercle was well-developed, smooth, and was slightly distal from the longitudinal axis of the tooth (Fig. 1 e). The tooth crown was pronouncely convex in its cervical third - cingulum basale (Figs. 1 c–d).

Mesial approximal surface was flat and nearly vertical, whilst the distal surface was convex and inclined (Figs. 1 a–b). On the mesial surface there was a facet near the incisal edge, most probably a consequence of approximal attrition. On the distal surface there was no characteristic attrition facet but in the incisal half of the distal and labial surfaces there was an oval depression with its cervico-incisal diameter of 2.5 mm, labio-palatal diameter of 1.5 mm, and the depth of 0.25 mm (Figs. 1 a, d). On the labial surface the depression continued to the triangular facet of 1 mm length. Depression surface was more rough in comparison to the surface of mesial attrition facet and to the surface of triangular facet into which the depression continued on the labial surface.

The course of cervical enamel line was macroscopically clearly visible on all tooth surfaces (Figs. 1 a–d). The height of the cervical curvature was 0.6 mm greater on the mesial than on the distal surface (Figs. 1 c–d). The cervical enamel line was positioned 0.4 mm more apically on the palatal than on the labial surface. Microscopically the cervical enamel line was smooth on the labial, palatal and mesial surfaces and scalloped on the distal surface.

The colour of the crown was browny-grey. Numerous vertical fracture lines were seen in enamel, especially on labial and palatal surfaces. Hard deposits were present on the palatal surface and in the middle of the mesial surface. On the palatal surface they formed a zone, covering mesial third of the surface, and also a smaller zone in the area of the palatal fossa. Their position and macroscopic appearance were not characteristic for dental calculus. It is usually attached to the enamel in the cervical part of the crown in the form of a band which marks the position of gingival margin.



Sl. 1: Zob iz arheološkega najdišča Mala Triglavca. **a:** z labialne strani (⇨ ovalna vboklina, ➔ plitka brazda z nazobčanimi robovi). **b:** s palatinalne strani. **c:** z mezialne strani (⇨ žlebičasto jamičaste razjede na korenini). **d:** z distalne strani (⇨ ovalna vboklina). **e:** z incizalne strani. **f:** z apikalne strani.
Fig. 1: Tooth from the archaeological site Mala Triglavca. **a:** labial aspect (⇨ oval depression, ➔ shallow furrow with toothed edges). **b:** palatal aspect. **c:** mesial aspect (⇨ root resorption with lots of little pits and grooves). **d:** distal aspect (⇨ oval depression). **e:** incisal aspect. **f:** apical aspect.

Oblikovne lastnosti zobne korenine

Večji del korenine je manjkal zaradi razjede. Ravnina koreninske razjede je bila vodoravna (sl. 1 c–d). Korenina in koreninski kanal sta bila ovalne oblike in sta imela labio-palatinalni premer večji kakor mezio-distalni (sl. 1 f). Koreninski kanal z labio-palatinalnim premerom 0,6 mm in mezio-distalnim premerom 0,2 mm je bil glede na velikost korenine nesorazmerno majhen. Zunanji rob razjedene korenine je bil tanek, nazobčan, površina se je od njega spuščala do koreninskega kanala. Razjedena površina je bila pri 40-kratni povečavi videti nekoliko hrapava. Zunanja površina korenine je bila gladka, le na mezialni ploskvi so bile plitke žlebičasto-jamičaste razjede (sl. 1c). Korenina je bila rjavorumene barve.

Zobne mere

Širina zobne krone je bila 5,2 mm, debelina 5,0 mm in dolžina 5,5 mm (razpredelnica 1). Širina korenine na zobnem vratu je bila 3,5 mm, debelina 4,2 mm in dolžina na labialni ploskvi, kjer je bila najmanj razjedena, 2,3 mm.

Rentgenološke lastnosti zoba

Na rentgenskem posnetku zoba je sklenina videti bela (radiopaktna), dentin sivkast, pulpina votlina skoraj črna (radiolucentna).

Na labio-palatinalni projekciji zoba iz Male Triglavce (sl. 2 a) je bila sklenina vidna na mezialni in distalni ploskvi, na mezio-distalni projekciji (sl. 2 b) pa na labial-

Surface of the tooth crown (enamel) was smooth except for the shallow and several milimeters long oblique furrow with toothed edges in the middle third of the labial surface (Fig. 1 a).

Morphological characteristics of the root

Most of the root was resorbed. Root resorption was in horizontal plane (Figs. 1 c–d). Root and root canal were oval with labiopalatal diameter greater than their mesiodistal diameter (Fig. 1 f). Root canal with its labiopalatal diameter of 0.6 mm and mesiodistal diameter of 0.2 mm was disproportionally small in comparison to root size. External edge of the resorbed root was thin, toothed, the apical root surface was sloping from it to the root canal. Resorbed surface was slightly rough at 40x magnification. The outer root surface was smooth, on its mesial surface were shallow resorptions with lots of little pits and grooves (Fig. 1 c). The colour of the root was browny-yellow.

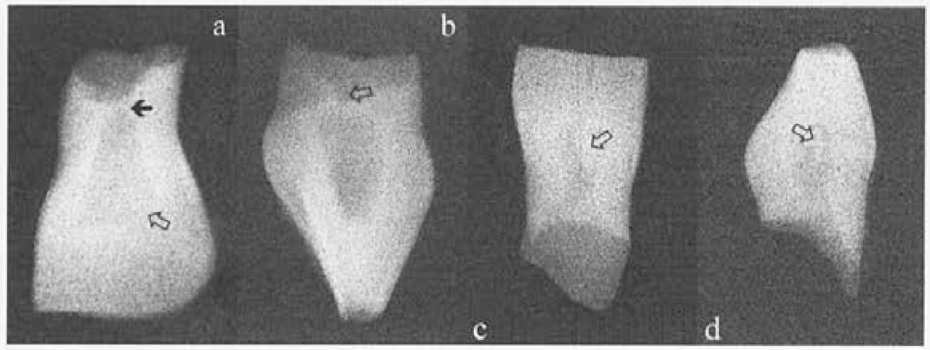
Dental measurements

Crown width was 5.2 mm, breadth 5.0 mm, and length 5.5 mm (Table 1). Cervical root width was 3.5 mm, breadth 4.2 mm, and the length on the labial surface, where resorption was the least, 2.3 mm.

Radiographic characteristics of the tooth

On the radiograph of the tooth the enamel appears white (radio-opaque), dentine grayish and pulp chamber almost black (radiolucent).

On the labiopalatal projection of the tooth from Mala Triglavca (Fig. 2 a) the enamel was visible on mesial and distal surfaces. On the mesiodistal projection (Fig. 2 b) the enamel was visible on labial and palatal surfaces; it was not presented at the incisal edge. The enamel was getting uniformly thinner from the incisal edge to the cervix. In comparison to the crown size the enamel and dentine were thin and pulp chamber extensive. On both projections the pulp chamber followed the outline of the



Sl. 2: Rentgenski posnetki zob iz Male Triglavce in Viktorjevega spodmola. **a:** zob iz Male Triglavce, labio-palatinalna projekcija (➔ radiopaktna pregrada, ⇨ vbočen pulpin prekat pod disto-incizalnim prehodom zobne krone). **b:** zob iz Male Triglavce, mezio-distalna projekcija (⇨ radiopaktna pregrada). **c:** zob iz Viktorjevega spodmola, labio-lingvalna projekcija (⇨ radiopaktna tvorba v pulpinem prekatu). **d:** zob iz Viktorjevega spodmola, mezio-distalna projekcija (⇨ radiopaktna tvorba v pulpinem prekatu).

Fig. 2: Radiographs of teeth from Mala Triglavca and Viktorjev spodmol. **a:** tooth from Mala Triglavca, labio-palatal projection (➔ radioopaque barrier, ⇨ concave pulp chamber under disto-incisal part of the crown). **b:** tooth from Viktorjev spodmol, mesio-distal projection (⇨ radioopaque barrier). **c:** labio-lingual projection (⇨ radioopaque formation in the pulp chamber). **d:** tooth from Viktorjev spodmol, mesio-distal projection (⇨ radioopaque formation in the pulp chamber).

ni in palatinalni ploskvi; na griznem robu je ni bilo. Sklenina se je od griznega roba proti zobnemu vratu enakomerno tanjšala. Sklenina in dentin sta bila tanka glede na velikost zobne krone, pulpin prekat pa obsežen. Na obeh projekcijah je pulpin prekat posnemal zunanji obris zobne krone (sl. 2 a-b), razen pod zaokroženim disto-incizalnim prehodom zobne krone, kjer je bil vbočen (sl. 2 a). Na labio-palatinalni projekciji je bil prekat najširši pod griznim robom, kjer se je končal ravno, brez divertiklov, v apikalni smeri se je ožil. Na mezio-distalni projekciji se je prekat ožil od zobnega vratu proti griznemu robu. Na obeh projekcijah je bila v vratnem predelu pulpinega prekata vidna radiopaktna pregrada (sl. 2 a-b).

3. 2 ZOB IZ VIKTORJEVEGA SPODMOLA

Oblikovne lastnosti zobne krone

Zobna krona je bila dobro ohranjena in, upoštevaje obrabo, ozka glede na dolžino (sl. 3 a-b). Obraba griznega roba je bila večja kakor pri zobu iz Male Triglavce - 4. stopnja po Molnarjevi razvrstitvi (Hillson, 1998). Vzdolž griznega roba je bil izpostavljen približno 1 mm ši-rok pas dentina. Grizni rob je bil debel 2,1 mm labio-ling-valno in je bil na vzdolžni osi zobne korenine (sl. 3 c-d). Pri pogledu z incizalne smeri je grizni rob potekal ravno (sl. 3 e).

Pri pogledu z labialne smeri je bil grizni rob na sredini nekoliko vbočen (sl. 3 a-b). V distalni smeri se je spuščal. Mezio-incizalni in disto-incizalni prehod sta bila ostra (sl. 3 a-b). Izbočenost vratne polovice labialne ploskve v mezio-distalni smeri je bila nekoliko večja mezialno kakor distalno, kar označujemo kot normalno značilnost krivulje (sl. 3 e-f). Labialna ploskev je bila gladka. Lingvalna ploskev ni imela prisotnih grebenov. Zobni tuberkel je bil dobro razvit, gladek in je ležal nekoliko distalno od vzdolžne osi zoba (sl. 3 e).

crown (Figs. 2 a-b) except under rounded distoincisal part of the crown where it was concave (Fig. 2 a). On labiopalatal projection the pulp chamber was the widest under the incisal edge where it ended in a straight line without diverticles; in the apical direction the pulp chamber narrowed. On the mesiodistal projection the pulp chamber narrowed from the cervix toward the incisal edge. On both projections there was radio-opaque septum in the cervical part of the pulp chamber (Figs. 2 a-b).

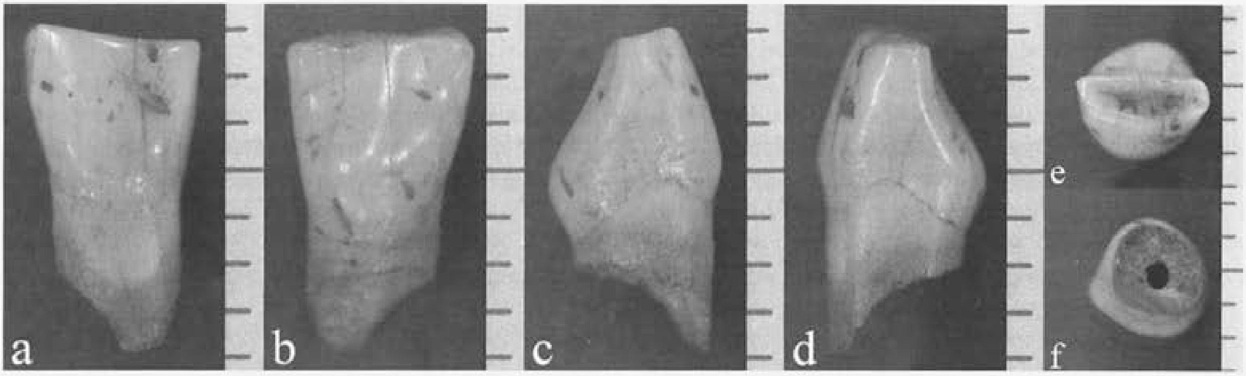
3. 2 TOOTH FROM VIKTORJEV SPODMOL

Morphological characteristics of the crown

The tooth crown was well preserved, if we take into account its wear it was narrow in comparison to its height (Figs. 3 a-b). Incisal wear was more extensive than the wear of the tooth from Mala Triglavca - 4th degree according to the Molnar´s scoring system (Hillson, 1998). A line of dentine of 1 mm width was exposed along the incisal edge. The incisal edge was 2.1 mm thick labiolingually and in the longitudinal root axis (Figs. 3 c-d). From the incisal aspect the incisal edge was straight (Fig. 3 e).

From labial aspect the incisal edge was slightly concave in its middle part (Figs. 3 a-b) and sloped downward distally. Mezioincisal and distoincisal angles were sharp (Figs. 3 a-b). Convexity of the cervical half of the labial surface in the mesiodistal direction was slightly more pronounced mesially than distally (Figs. 3 e-f). Labial surface was smooth. There were no ridges on the lingual surface. Dental tubercle was well-developed and smooth, its position was slightly distal from the longitudinal tooth axis (Fig. 3 e).

On mesial and distal approximal surfaces there were two facets, most probably due to approximal attrition. Mesial facet was seen macroscopically (cervicoincisal



Sl. 3: Zob iz arheološkega najdišča Viktorjev spodmol. **a:** z labialne strani. **b:** s palatinalne strani. **c:** z mezialne strani. **d:** z distalne strani. **e:** z incizalne strani. **f:** z apikalne strani.
Fig. 3: Tooth from the archaeological site Viktorjev spodmol. **a:** labial aspect. **b:** palatal aspect. **c:** mesial aspect. **d:** distal aspect. **e:** incisal aspect. **f:** apical aspect.

Na mezialni in distalni aproksimalni ploskvi sta bili prisotni faseti, ki sta verjetno nastali zaradi aproksimalne atricije. Mezialno faseto smo ugotovili že makroskopsko (cerviko-incizalni premer 1,8 mm, labio-lingvalni premer 1,3 mm), distalno pa le mikroskopsko.

Makroskopsko je bil potek skleninsko-cementne meje dobro viden na vseh zobnih ploskvah (sl. 3 a–d). Višina mezialnega loka skleninsko-cementne meje je bila 0,3 mm večja od višine distalnega (sl. 3 c–d). Na lingvalni ploskvi je potekala skleninsko-cementna meja 0,9 mm bolj apikalno kakor na labialni. Mikroskopsko je bil potek skleninsko-cementne meje na labialni ploskvi valovit, podoben poteku na distalni aproksimalni ploskvi zoba iz Male Triglavce, na preostalih ploskvah je bil gladek.

Zobna krona je bila rjavosiva, vendar nekoliko temnejša kakor krona zoba iz Male Triglavce. Na labialni in lingvalni ploskvi je bilo v sklenini več drobnih rjavih zabarvanj. Na vseh ploskvah so bile v sklenini številne navpično potekajoče poke. Na mezialni ploskvi so bile prisotne podobne trde obloge, kakršne so opisane pri zobu iz Male Triglavce.

Razpredelnica 1: Mere zob iz arheoloških najdišč Mala Triglavca in Viktorjev spodmol (mm).
Table 1: Dental measures of teeth from archaeological sites Mala Triglavca and Viktorjev spodmol (mm).

diameter 1.8 mm, labiolingual diameter 1.3 mm), distal facet was seen only microscopically.

The course of cervical enamel line was macroscopically clearly visible on all tooth surfaces (Figs. 3 a–d). The height of the cervical curvature was 0.3 mm greater on the mesial than on the distal surface (Figs. 3 c–d). The cervical enamel line was positioned 0.9 mm more apically on the lingual than on the labial surface. Microscopic course of the cervical enamel line on the labial surface was scalloped, similar to its course on the distal approximal surface of the tooth from Mala Triglavca, the course of cervical enamel line on other surfaces was smooth.

The crown was browny-grey but slightly darker than the crown of the tooth from Mala Triglavca. On the labial and lingual surface there were several small brown colorations. On all surfaces there were numerous vertically oriented fracture lines. On the mesial surface there were similar hard deposits as described on the tooth from Mala Triglavca.

Morphological characteristics of the root

Most of the root was resorbed. The plane of root resorption was oblique labio-apico – linguo-incisaly, so that the length of the remaining root was 3.4 mm labially and 0.8 mm lingually (Figs. 3 c–d). The shape of the root and root canal was rounded-oval. Root canal with its labiolingual diameter of 1 mm and mesiodistal diameter of 0.8 mm occupied one fourth of the root diameter. Apically the resorbed root had a thin edge whose surface sloped steeply to the root canal. Oblique apical root surface was at 40x magnification slightly rough. Its outer surface was smooth. Root was browny-yellow, except for the 1–2 mm wide apical zone, which was brown.

Najdišče Site	Dolžina zoba Length of tooth	Krona / Crown			Korenina / Root		
		Širina Width	Debelina Breadth	Dolžina Length	Širina Width	Debelina Breadth	Dolžina Length
Mala Triglavca	7.8	5.2	5.0	5.5	3.5	4.2	2.3
Viktorjev spodmol	7.4	4.0	3.9	4.0	2.9	3.1	3.4

Oblikovne lastnosti zobne korenine

Večina korenine je manjkala zaradi razjede. Ravnina koreninske razjede je bila poševna labialno apikalno - lingvalno incizalno, tako da je bila dolžina preostanka korenine labialno 3,4 mm in lingvalno 0,8 mm (sl. 3 c-d). Korenina in koreninski kanal sta bila okroglo-ovalne oblike. Koreninski kanal z labio-lingvalnim premerom 1 mm in mezio-distalnim premerom 0,8 mm je zavzemal četrtino koreninskega premera. Apikalno je imela razjedena korenina tanek rob, od katerega se je površina strmo spuščala do koreninskega kanala. Poševna apikalna površina korenine je bila pri 40-kratni povečavi videti nekoliko hrapava. Njena zunanja površina je bila gladka. Korenina je bila rjavorumena razen 1-2 mm širokega apikalnega pasu, ki je bil rjav.

Zobne mere

Širina zobne krone je bila 4,0 mm, dolžina 4,0 mm in debelina 3,9 mm (razpredelnica 1). Širina korenine na zobnem vratu je bila 2,9 mm, debelina 3,1 mm in dolžina na labialni ploskvi, kjer je bila najmanj razjedena, 3,4 mm.

Rentgenološke lastnosti zoba

Na labio-lingvalni projekciji (sl. 2 c) je bila vidna tanka radiopaktna plast sklenine na mezialni in distalni ploskvi zobne krone, na mezio-distalni projekciji (sl. 2 d) pa na labialni in lingvalni ploskvi; na griznem robu je ni bilo. Sklenina je bila tanjša kakor na zobu iz Male Triglavce. Od griznega roba proti zobnemu vratu se je enakomerno tanjšala. Tudi pri tem zobu je bil pulpin prekat sorazmerno obsežen glede na debelino sklenine in dentina. Pulpin prekat je bil najožji mezio-incizalno in se je v apikalni smeri širil. Na mezio-distalni projekciji je bil najširši v predelu zobnega vratu in se je v incizalni smeri ožil. V incizalni polovici pulpinega prekata je bila vidna podolgovata tvorba z rentgenološko gostoto dentina (sl. 2 c-d).

3. 3 OBLIKOVNE LASTNOSTI MLEČNIH SEKALCEV Z MAVČNIH MODELOV

Zgornji sekalci

Nesomernostni znaki zobne krone so bili pogosteje prisotni pri prvem zgornjem sekalcu kakor pri drugem (razpredelnica 2). Normalno značilnost krivulje smo ugotovili pri 58 % prvih in pri 40 % drugih sekalcev. Značilnost kota je imelo 85 % prvih in 67 % drugih sekalcev. Pri večini sekalcev je bil zobni tuberkel na sredini palatinalne ploskve: pri 87 % prvih in 84 % drugih.

Dental measurements

The width of the crown was 4.0 mm, the length 4.0 mm, and breadth 3.9 mm (Table 1). Cervical width of the root was 2.9 mm, cervical breadth 3.1 mm, and the length on the labial surface, where resorption was the least, 3.4 mm.

Rentgenographic characteristics

On the labiolingual projection (Fig. 2 c) thin radio-opaque enamel layer was visible on mesial and distal surfaces of the crown, and on the mesiodistal projection (Fig. 2 d) on labial and lingual surfaces; it was absent on the incisal edge. The enamel was thinner than on the tooth from Mala Triglavca. It was getting thinner uniformly from the incisal edge toward the cervix. Also at this tooth the pulp chamber was extensive in comparison to the thickness of the enamel and dentine. The narrowest part of the pulp chamber was mesioincisal and was getting wider toward the apical direction. On the mesiodistal projection it was the widest in cervical part and it was getting narrow toward incisal direction. In the incisal half of the pulp chamber there was an oblong formation with radiologic density of dentine (Figs. 2 c-d).

3.3 MORPHOLOGICAL CHARACTERISTICS OF DECIDUOUS INCISORS FROM DENTAL CASTS

Upper incisors

Asymmetric characteristics of the tooth crown were more frequently present on the first upper incisor than on the second (Table 2). More pronounced mesial convexity of the labial surface was found at 58 % of the first and 40 % of the second incisors. Sharp transition of mesial approximal surface to the incisal edge and rounded transition of distal approximal surface to the incisal edge was present at 85 % of first and 67 % of second incisors. Dental tubercle was positioned in the middle of the palatal surface at the majority of incisors: at 87 % of first and 84 % of second incisors.

Lower incisors

Crown of the lower central incisors was more symmetrical in comparison with the lower lateral incisors (Table 2). More pronounced mesial convexity of the labial surface was present at 71 % of second and only 10 % of first incisors. Mesioincisal angle sharper than distoincisal angle was present at 80 % of lateral incisors and only 2 % of central incisors. Dental tubercle was positioned

Spodnji sekalci

Prvi spodnji sekalci so imeli v primerjavi z drugimi bolj somerno zobno krono (razpredelnica 2). Normalno značilnost krivulje je imelo 71 % drugih in le 10 % prvih sekalcev. Drugi sekalec je imel v 80 % prisotno značilnost kota, prvi sekalec le v 2 %. Zobni tuberkel je bil pomaknjen distalno pri 36 % drugih sekalcev, pri prvem sekalcu je bil vedno na sredini lingvalne ploskve.

3.4 OBLIKOVNE IN RENTGENOLOŠKE LASTNOSTI IZDRTIH MLEČNIH SEKALCEV

Obrabljenost griznega roba

Pri pregledu 20 mlečnih sekalcev smo pri 18 ugotovili izpostavljen dentin vzdolž griznega roba. Pri enem izmed njih je bil obrabljen večji del zobne krone, in po temnejši barvi sodeč, je bil izpostavljen tudi sekundarni dentin.

Aproksimalna obraba

Obrabljenost mezialne in distalne aproksimalne ploskve je bilo mogoče ugotavljati pri 11 izdrtih mlečnih sekalcih: osem sekalcev ni imelo atricijskih faset, trije so jo imeli na eni izmed aproksimalnih ploskev, v nobe-

Razpredelnica 2: Pogostnost oblikovnih znakov na mlečnih sekalcih z mavčnih modelov današnjih slovenskih otrok (%).
Table 2: Frequency of morphological characteristics at deciduous incisors from dental casts of contemporary Slovenian children (%).

distally at 36 % of second incisors, it was always in the middle of the lingual surface at first incisors.

3.4 MORPHOLOGICAL AND RADIOGRAPHIC CHARACTERISTICS OF EXTRACTED DECIDUOUS INCISORS

Wear of the incisal edge

At the examination of 20 deciduous incisors we found exposed dentine along incisal edge with 18 incisors. One of them had a worn major part of the tooth crown and according to its darker colour secondary dentine was also exposed.

Approximal wear

Wear of the approximal surfaces was possible to determine at 11 extracted deciduous incisors: 8 of them did not have wear facets, 3 had facets only on one approximal surface, none had wear facet on both approximal surfaces.

Course of cervical enamel line

With 13 upper and two lower deciduous incisors we could compare the position of cervical enamel line on labial and lingual surfaces. All 13 upper incisors exhibited cervical enamel line in the same level labially and palatally, at both lower incisors the cervical enamel line was positioned more apically on the lingual than on the labial side.

Microscopic course of cervical enamel line frequently exhibited scalloped appearance, more frequent-

Oblikovna lastnost Morphological characteristic	**Zgornji sekalec Upper incisor**		**Spodnji sekalec Lower incisor**	
	Prvi First	**Drugi Second**	**Prvi First**	**Drugi Second**
Značilnost krivulje / Mesiodistal curvature of labial surface				
Normalna Mesially more pronounced than distally	58	40	10	71
Somerna Symmetric	42	60	90	29
Značilnost kota / Mesioincisal angle				
Prisotna Sharper than distoincisal	85	67	2	80
Mezialno in distalno enaka Equally rounded as distoincisal	15	33	98	20
Lega zobnega tuberkla / Position of dental tubercle				
Na sredini palatinalne ploskve Centred	87	84	100	64
Pomaknjen distalno Off centre to distal	11	16	0	36
Pomaknjen mezialno Off centre to mesial	2	0	0	0

nem primeru nista bili prisotni na obeh aproksimalnih ploskvah.

Potek skleninsko-cementne meje

Pri 13 zgornjih in dveh spodnjih mlečnih sekalcih smo lahko primerjali lego skleninsko-cementne meje na labialni in lingvalni ploskvi. Pri vseh 13 zgornjih sekalcih je bila skleninsko-cementna meja v isti višini labialno in palatinalno, pri obeh spodnjih sekalcih pa je bila lingvalno bolj apikalno kakor labialno.

Mikroskopski potek skleninsko-cementne meje je bil pogosto valovit, pogosteje na aproksimalnih ploskvah (na 11 izmed 33 pregledanih aproksimalnih ploskvah) kakor labialno in lingvalno (na 7 izmed 26 pregledanih labialnih in lingvalnih ploskvah).

Rentgenološke lastnosti zob

Sklenina je bila vidna na vseh rentgenskih posnetkih izdrtih sekalcev. Njena debelina je bila podobna kakor na izkopanih zobeh. Pulpina votlina je bila velika glede na debelino sklenine in dentina. Z izjemo enega spodnjega sekalca z neresorbirano korenino se je pulpin prekat izdrtih sekalcev pod griznim robom končal ravno, brez divertiklov, pri enem izmed izdrtih zgornjih sekalcev pa je bila pulpina votlina v celoti obliterirana.

3.5 ZOBNE MERE MLEČNIH SEKALCEV Z MAVČNIH MODELOV

Zgornji sekalci

Zobna krona prvega sekalca je bila v povprečju širša in debelejša od krone drugega sekalca (razpredelnica 3).

Razpredelnica 3: Primerjava širine in debeline krone zoba iz Male Triglavce s povprečno vrednostjo in razponom širine in debeline zobne krone zgornjih mlečnih sekalcev na mavčnih modelih današnjih slovenskih otrok (v mm).
Table 3: Comparison of the crown width and crown breadth for the tooth from Mala Triglavca with mean and range for width and breadth of the tooth crown at upper incisors from dental casts of contemporary Slovenian children (mm).

ly on approximal surfaces (11 out of 33 examined approximal surfaces) than on labial and lingual surfaces (7 out of 26 labial and lingual surfaces examined).

Radiographic characteristics of the teeth

Enamel was visible on all radiographs of extracted teeth. Its thickness was similar to that of the excavated teeth. Pulp chamber was extensive in comparison to the thickness of enamel and dentine. With all teeth, except one lower incisor without root resorption, the pulp chamber of extracted teeth finished straight under the incisal edge, without diverticles. With one upper extracted tooth the pulp chamber was totally obliterated.

3.5 DENTAL MEASUREMENTS OF DECIDUOUS INCISORS FROM DENTAL CASTS

Upper incisors

Crown of the upper first incisor had on average greater width and breadth in comparison to the crown of the second incisor (Table 3). The range for the crown width was 5.6–7.1 mm for the first incisor and 4.2–6.0 mm for the second incisor. The range for the crown breadth was 4.1–5.5 mm for the first incisor and 4.0–5.9 mm for the second incisor. The average difference between the width and breadth was 1.4 mm for the first and 0.4 mm for the second incisor.

Lower incisors

Crown of the lower second incisor had on average greater width and breadth in comparison to the crown of the second incisor. (Table 4). The range for the crown width was 3.5–4.5 mm for the first and 4.0–5.0 mm for the second incisor. The range for the crown breadth was 3.2–4.1 mm for the first incisor and 3.8–5.0 mm for the second incisor. The average difference between the crown width and breadth was 0.3 mm for the first and second incisor.

Mera na zobni kroni Crown dimension	Zob / Tooth from Mala Triglavca	Zgornji mlečni sekalci na mavčnih modelih Upper deciduous incisors from dental casts							
		Prvi / First				Drugi / Second			
		N	$\bar{x}$	SD	Range	N	$\bar{x}$	SD	Range
Širina / Width	**5.2**	36	6.2	0.40	5.6–7.1	47	5.1	0.41	4.2–6.0
Debelina / Breadth	**5.0**	43	4.8	0.33	4.1–5.5	47	4.6	0.40	4.0–5.9

N – število zob, $\bar{x}$ – povprečna vrednost, SD – standardno odstopanje.
N – number of teeth, $\bar{x}$ – mean, SD – standard deviation.

Razpon širine zobne krone prvega sekalca je bil 5,6–7,1 mm, drugega sekalca 4,2–6,0 mm. Razpon debeline zobne krone prvega sekalca je bil 4,1–5,5 mm, drugega 4,0–5,9 mm. Povprečna razlika med širino in debelino zobne krone je bila pri prvih sekalcih 1,4 mm, pri drugih pa 0,4 mm.

Spodnji sekalci

Zobna krona drugega sekalca je bila v povprečju širša in debelejša od krone prvega sekalca (razpredelnica 4). Razpon širine zobne krone prvega sekalca je bil 3,5–4,5 mm, drugega sekalca 4,0–5,0 mm. Razpon debeline zobne krone prvega sekalca je bil 3,2–4,1 mm, drugega sekalca 3,8–5,0 mm. Povprečna razlika med širino in debelino zobne krone je bila pri prvih in drugih sekalcih 0,3 mm.

4 Razprava

Na osnovi oblikovnih, merskih in rentgenoloških lastnosti izkopanih zob, ki so bile enake ali podobne lastnostim mlečnih sekalcev pri današnjih otrocih, sklepamo, da sta izkopana zoba najverjetneje človeška mlečna sekalca.

4. 1 Oblikovne in merske lastnosti zoba iz Male Triglavce

Zob iz Male Triglavce po oblikovnih lastnostih in velikosti ustreza zgornjemu mlečnemu sekalcu. Na dobro ohranjeni zobni kroni smo lahko ugotavljali vse glavne oblikovne lastnosti, s katerimi določamo zgornje mlečne sekalce: jasno izražena značilnost kota in normalna značilnost krivulje, plitka palatinalna vdolbina, palatinalni obrobni grebeni, lega zobnega tuberkla, značilne

Razpredelnica 4: Primerjava širine in debeline krone zoba iz Viktorjevega spodmola s povprečno vrednostjo in razponom širine in debeline zobne krone spodnjih mlečnih sekalcev na mavčnih modelih današnjih slovenskih otrok (v mm).
Table 4: Comparison of the crown width and breadth for the tooth from Viktorjev spodmol with mean and range for width and breadth of the tooth crown at lower incisors from dental casts of contemporary Slovenian children (mm).

Mera na zobni kroni Crown dimension	Zob / Tooth from Viktorjev spodmol	Spodnji mlečni sekalci na mavčnih modelih Lower deciduous incisors from dental casts							
		Prvi / First				Drugi / Second			
		N	$\bar{x}$	SD	Range	N	$\bar{x}$	SD	Range
Širina / Width	**4.0**	25	3.9	0.22	3.5–4.5	45	4.5	0.31	4.0–5.0
Debelina / Breadth	**3.9**	24	3.7	0.31	3.2–4.1	45	4.3	0.31	3.8–5.0

N – število zob, $\bar{x}$ – povprečna vrednost, SD – standardno odstopanje.
N – number of teeth, $\bar{x}$ – mean, SD – standard deviation.

4 Discussion

From the morphological, metrical, and radiographic characteristics of excavated teeth, which are equal or similar to the characteristics of deciduous incisors of contemporary children, we can conclude that the excavated teeth are most probably human deciduous incisors.

4. 1 Morphological and metrical characteristics of the tooth from Mala Triglavca

According to its morphological characteristics the tooth from Mala Triglavca corresponds to an upper deciduous incisor. On well preserved tooth crown we could determine all the major morphological characteristics important for the determination of upper deciduous incisors: mesioincisal angle sharper than distoincisal, curvature of labial surface more pronounced mesially, shallow palatal fossa, palatal marginal ridges, position of dental tubercle, characteristic features of approximal surfaces, position of incisal edge, cingulum basale, characteristic course of cervical enamel line. Distinctly expressed asymmetric features (mesiodistal curvature of labial surface more pronounced mesially, mesioincisal angle sharper than distoincisal, contact area located more cervically on the distal approximal surface and more incisally on the mesial approximal surface, slightly distal position of dental tubercle, greater cervical line curvature on mesial approximal surface than on distal) indicate that the excavated tooth is the upper left deciduous incisor. Regarding morphological characteristics only, it could be difficult to determine if the tooth is the first or second incisor. Mesio-distal flatness (constriction) of the root points to the second incisor (Logar, 1955). Concavity of the mesial part of incisal edge is the consequence of wear. Root canal is narrowed probably due to the deposition of secondary dentine.

From the crown width and the proportions between the crown width and breadth and between the crown width and length we can exclude the first upper incisor with great probability. Crown width of the tooth from Mala Triglavca (5.2 mm) is nearly identical to the mean width of the upper second incisor from contemporary Slovenian children (5.1 mm), but it does not correspond to the range between lastnosti aproksimalnih ploskev, lega griznega roba, bazalni cingulum, značilen potek skleninsko-cementne meje. Jasno izraženi nesomernostni znaki (normalna značilnost krivulje, kota in kontaktne točke, nekoliko distalno pomaknjen zobni tuberkel, višina mezialnega loka skleninsko-cementne meje večja od višine distalnega) kažejo, da je to levi zgornji mlečni sekalec. Težko pa na osnovi oblikovnih znakov določimo, ali je prvi ali drugi sekalec. Mezio-distalna sploščenost korenine nakazuje, da je drugi sekalec (Logar, 1955). Vbočenost mezialnega dela griznega roba je posledica obrabe. Koreninski kanal je zožen verjetno zaradi nalaganja sekundarnega dentina.

Na osnovi širine zobne krone in odnosov med širino in debelino ter med širino in dolžino zobne krone lahko z veliko verjetnostjo izključimo prvi zgornji sekalec. Širina krone zoba iz Male Triglavce (5,2 mm) je skoraj enaka povprečni širini drugega zgornjega sekalca pri današnjih slovenskih otrocih (5,1 mm), ne uvršča pa se v razpon med največjo in najmanjšo širino prvega zgornjega sekalca pri današnjih slovenskih otrocih (5,6–7,1 mm).

Za zgornji prvi mlečni sekalec je značilno, da je širina zobne krone precej večja od debeline (Woelfel in Scheid, 2001). Pri prvem zgornjem sekalcu z mavčnih modelov je bila povprečna razlika med širino in debelino zobne krone 1,4 mm. Pri drugem zgornjem sekalcu je bila širina zobne krone večja od debeline povprečno za 0,4 mm; podobna je bila tudi razlika pri sekalcu iz Male Triglavce (0,2 mm).

Znano je tudi, da je prvi zgornji mlečni sekalec edini med sekalci, pri katerem je dolžina zobne krone manjša od širine (Ash, 1993). Pri sekalcu iz Male Triglavce je bila dolžina zobne krone 0,3 mm večja od širine, pri neobrabljeni kroni pa je bila razlika še večja.

4. 2 OBLIKOVNE IN MERSKE LASTNOSTI ZOBA IZ VIKTORJEVEGA SPODMOLA

Zob iz Viktorjevega spodmola po oblikovnih lastnostih in velikosti ustreza spodnjemu mlečnemu sekalcu. Tudi zobna krona tega zoba je bila dobro ohranjena in smo lahko ugotovili bistvene oblikovne lastnosti, ki določajo spodnji mlečni sekalec: ozka zobna krona, manj izrazita značilnost kota in krivulje, lega griznega roba na vzdolžni osi zobne korenine, značilen potek skleninsko-cementne meje, gladka lingvalna ploskev, oblika korenine. Glede na prisotnost za spodnje sekalce jasno izraženih nesomernostnih znakov (nakazana normalna značilnost krivulje, nekoliko distalno pomaknjen zobni tuberkel, višina mezialnega loka skleninsko-cementne meje večja od višine distalnega) lahko trdimo, da je to spodnji levi mlečni sekalec, verjetneje drugi kakor prvi. Vbočenost griznega roba, njegovo spuščanje v distalni smeri in ostra prehoda v aproksimalni ploskvi so posledice obrabe.

the greatest and the smallest width of the first upper incisor of contemporary Slovenian children (5.6–7.1 mm).

It is characteristic for the first upper deciduous incisor that its crown width is much greater than its crown breadth (Woelfel and Scheid, 2001). With the first upper incisor from dental casts the mean difference between the crown width and crown breadth was 1.4 mm. With the second upper incisor the mean difference was 0.4 mm and similar with the incisor from Mala Triglavca (0.2 mm).

It is also known that the first upper deciduous incisor is the only one among incisors with smaller crown length than its width (Woelfel and Scheid, 2001). With the incisor from Mala Triglavca the crown length was 0.3 mm greater than its width, unworn crown had this difference even greater.

4. 2 MORPHOLOGICAL AND METRICAL CHARACTERISTICS OF THE TOOTH FROM VIKTORJEV SPODMOL

According to its morphological and metrical characteristics the tooth from Viktorjev spodmol corresponds to a lower deciduous incisor. Its tooth crown was also well preserved and we could determine significant morphological characteristics determining lower deciduous incisor: narrow crown, less significant roundness of mesioincisal and distoincisal angles and of mesiodistal curvature of labial surface, incisal edge position in the longitudinal root axis, characteristic course of cervical enamel line, smooth lingual fossa, the shape of the root. Due to the presence of distinctly expressed asymmetric features (mesiodistal curvature of labial surface slightly more pronounced mesially, slightly distal position of dental tubercle, height of mesial curve of cervical enamel line larger than distal curve) we can state that the tooth is the lower left deciduous incisor, more probably the second than the first. Concavity of incisal edge, its sloping in the distal direction and sharp angles between approximal surfaces and incisal edge are consequences of wear.

All tooth measurements were lower than with the tooth from Mala Triglavca, only its incisal edge was 0.7 mm thicker, indirectly a consequence of more extensive wear. Crown width and breadth of the lower deciduous incisors are nearly equal. With the first and second deciduous incisor from the dental casts the mean difference between the crown width and breadth was 0.3 mm. Similarly, the incisor from Viktorjev spodmol had crown width 0.1 mm greater than its breadth.

Crown width of the tooth from Viktorjev spodmol (4.0 mm) was in the range between the minimal and maximal width (3.5–4.5 mm) for the first lower incisor determined from dental casts of contemporary Slovenian children. It was also identical to the smallest measured width of the second lower incisor. Crown breadth of the tooth from Viktorjev spodmol (3.9 mm) was in the

Vse zobne mere so bile manjše kakor pri sekalcu iz Male Triglavce, le grizni rob je bil 0,7 mm debelejši, kar je posredno posledica večje obrabljenosti. Širina in debelina zobne krone pri spodnjih mlečnih sekalcih sta približno enaki. Pri prvem in drugem spodnjem sekalcu z mavčnih modelov je bila povprečna razlika med širino in debelino zobne krone 0,3 mm. Podobno je bila pri sekalcu iz Viktorjevega spodmola širina zobne krone 0,1 mm večja od debeline.

Širina krone zoba iz Viktorjevega spodmola (4,0 mm) se uvršča v razpon med najmanjšo in največjo širino prvega spodnjega sekalca, izmerjeno na mavčnih modelih današnjih slovenskih otrok (3,5–4,5 mm), obenem je enaka najmanjši izmerjeni širini drugega spodnjega sekalca. Debelina krone zoba iz Viktorjevega spodmola (3,9 mm) se uvršča v razpon med najmanjšo in največjo debelino tako prvega (3,2–4,1 mm) kakor drugega spodnjega sekalca (3,8–5,0 mm) pri današnjih slovenskih otrocih. Širina in debelina zobne krone sta bliže povprečni širini in povprečni debelini krone prvega kakor drugega spodnjega sekalca. Širina krone se npr. ne uvršča v razpon med standardnima odklonoma od povprečne širine krone drugega spodnjega sekalca pri današnjih slovenskih otrocih. Tako je spodnji sekalec iz Viktorjevega spodmola glede na mere verjetneje prvi, kar je nasprotno določitvi na osnovi oblikovnih lastnosti, po katerih je bolj podoben drugemu spodnjemu sekalcu.

Velika podobnost zobnih mer izkopanih mlečnih sekalcev in mlečnih sekalcev sedanjih otrok potrjuje ugotovitev Brabanta (1971), da se velikost zobnih kron mlečnih zob od neolitika do danes ni bistveno spremenila.

4. 3 RENTGENOLOŠKE LASTNOSTI IZKOPANIH ZOB IN MLEČNIH ZOB DANAŠNJIH SLOVENSKIH OTROK

Razmerje med pulpino votlino in trdimi zobnimi tkivi, ki smo ga ugotovili iz rentgenskih posnetkov izkopanih zob, je značilno za človeške mlečne zobe: tanka plast sklenine in dentina, pulpina votlina pa obsežna (tanjša sklenina pri spodnjem sekalcu kakor pri zgornjem je prav tako značilna lastnost človeških mlečnih sekalcev). Sekundarni dentin, ki se stalno nalaga, a pri različnih zobeh lahko različno hitro (Rölling, 1981), spremeni razmerje med pulpino votlino in debelino sklenine ter dentina. Ta pojav smo opazili pri mlečnih sekalcih današnjih otrok in tudi pri izkopanih sekalcih, kjer je sekundarni dentin zaprl divertikle, pulpin prekat sekalca iz Male Triglavce pa je bil celo vbočen pod disto-incizalnim prehodom. Radiopaktna pregrada v vratnem predelu pulpine votline je ali sekundarni dentin ali rentgenološki artefakt zaradi superpozicije dentinskih struktur.

V pulpinem prekatu sekalca iz Viktorjevega spod-

range between the minimal and the maximal breadth of the first (3.2-4.1 mm) and also of the second (3.8-5.0 mm) lower incisor of contemporary Slovenian children. Crown width and crown breadth are closer to mean width and mean breadth of the first than the second lower incisor. Crown width was not inside the range between standard deviation for mean crown width of the second lower incisor of contemporary Slovenian children. The lower incisor from Viktorjev spodmol is according to its measures more probably the first incisor, in contrary to the determination based on the morphological characteristics, which are more similar to the second lower incisor.

Great similarity of dental measurements of excavated deciduous incisors and deciduous incisors from contemporary children confirmed the findings of Brabant (1971) that the crown size of deciduous teeth did not change significantly from Neolithic till today.

4. 3 RADIOGRAPHIC CHARACTERISTICS OF EXCAVATED TEETH AND DECIDUOUS TEETH OF CONTEMPORARY SLOVENIAN CHILDREN

Proportion between the pulp chamber and hard dental tissues found on the radiographs of excavated teeth is characteristic for human deciduous teeth: thin enamel and dentine layer and extensive pulp chamber (thinner enamel with the lower incisor than with the upper one is also a normal characteristic of human deciduous teeth). Continuous deposition of secondary dentine with different rate at different teeth (Rolling, 1981) changes the proportion between the pulp chamber and the thickness of enamel and dentine. This phenomenon was observed also at deciduous incisors of contemporary children and also at the excavated incisors where secondary dentine closed the pulp diverticles. Pulp chamber of the incisor from Mala Triglavca was even concave under distoincisal angle. Radio-opaque barrier in the cervical part of the pulp chamber is either a secondary dentine or a radiographic artefact due to the superposition of dentine structures.

In the pulp chamber of the incisor from Viktorjev spodmol there was a mineralized formation, which could be a secondary dentine or a pulp stone, not uncommon for deciduous teeth (Zerosi, 1961; Rolling, 1981).

4. 4 TOOTH WEAR

It is known that enamel of deciduous teeth is less mineralised than enamel of permanent teeth. Therefore, it is more extensively worn and deciduous teeth in spite of their short time of usage become more extensively worn (Berkowitz and Moxham, 1981). This wear is one of the features for mature deciduous dentition and also a condition for establishing the correct intermaxillary relamola je mineralizirana tvorba, ki je lahko sekundarni dentin, lahko pa bi bil pulpni kamen, kar za mlečne zobe ni nenavadno (Zerosi, 1961; Rölling, 1981).

4. 4 OBRABA ZOB

Znano je, da je sklenina mlečnih zob manj mineralizirana kakor sklenina stalnih zob, zato se hitreje obrablja in postanejo mlečni zobje kljub kratki uporabnostni dobi močno obrabljeni (Berkovitz in Moxham, 1981). Ta obrabljenost je eden od znakov zrelega mlečnega zobovja in pogoj za vzpostavitev pravilnih medčeljustih odnosov pred pričetkom izraščanja stalnih zob (Rant, 1970). Ker je bil zaradi obrabe dentin izpostavljen na griznih robovih obeh izkopanih sekalcev, domnevamo, da je bil pri obeh otrocih odnos čeljustnic normalen. Podobno obrabo smo ugotovili tudi pri pregledu izdrtih mlečnih sekalcev. Na mlečnih zobeh iz predzgodovinskih grobišč v dolini reke Illinois so pogosto ugotovili izpostavljen dentin že po 27. mesecu otrokove starosti (Bullington, 1991).

Zaradi aproksimalne atricije nastanejo ostro omejene zabrušene ploskve - atricijske fasete - na stikih med sosednjimi zobmi. Iz prisotnosti atricijske fasete lahko sklepamo, da je bil zob za časa življenja na tem mestu v stiku s sosednjim zobom. Zgornji mlečni sekalec iz Male Triglavce ima atricijsko faseto na mezialni aproksimalni ploskvi, na incizalni polovici distalne aproksimalne in delu labialne ploskve pa vboklino ovalne oblike. Spodnji sekalec iz Viktorjevega spodmola ima atricijsko faseto na obeh aproksimalnih ploskvah. Pri pregledu izdrtih mlečnih sekalcev smo ugotovili, da odsotnost ene ali obeh atricijskih faset pri današnjih otrocih ni neobičajna, kar je lahko posledica kratkotrajnega medzobnega stika ali pa so bile med zobmi že od začetka prisotne vrzeli. Pri današnjih otrocih lahko obstajajo razmaki med mlečnimi zobmi že ob njihovem izraščanju ali se zaradi rasti čeljusti pojavijo do petega leta starosti (Rant, 1970). Tako lahko trdimo, da je bil drugi zgornji mlečni sekalec iz Male Triglavce v stiku s prvim sekalcem, ne pa s podočnikom. Spodnji sekalec iz Viktorjevega spodmola je bil v stiku z obema sosednjima zobema. Nastanek ovalne vbokline na zgornjem mlečnem sekalcu je nejasen. Ker je njena površina pri povečavi videti gladko zabrušena, ni posledica odkrušenja po smrti (v zemlji). Glede na obliko in lego verjetno tudi ni razvojna napaka. Nastajala je dalj časa kakor atricijske fasete ali pa je bil brusni učinek večji. Potrebna bi bila natančnejša raziskava, da bi poskusili pojasniti njen nastanek. Poševno potekajoča brazda ostrih robov na labialni ploskvi zgornjega sekalca prav tako ne more biti razvojna napaka; verjetno je nastala z odkrušenjem sklenine po smrti.

tionships before permanent teeth start to erupt (Rant, 1970). Since dentine exposition due to wear on the incisal edge of both excavated incisors was present, we hypothesized that both children had normal intermaxillary relationships. Similar wear was found also at the examination of extracted deciduous incisors. On deciduous teeth from prehistoric cemetery sites located in the Illinois River Valley, the dentine was often exposed past the 27th month of a child's age (Bullington, 1991).

Approximal attrition leads to polished surfaces with clear boundaries - wear facets - at the contact points between neighbouring teeth. From the presence of wear facet we can conclude that the tooth was in contact with the neighbouring tooth during the lifetime. The upper deciduous incisor from Mala Triglavca had attrition facet on the mesial approximal surface, on the incisal half of the distal approximal surface and labial surfaces had oval concavity. The lower incisor from Viktorjev spodmol had the attrition facets on both approximal surfaces. At the examination of deciduous teeth from our collection we found out that the absence of one or both wear facets was not unusual in contemporary children: this is due to the short time of interdental contact or the gaps between teeth had already been present from the beginning. With contemporary children the gaps between deciduous teeth can be present already at their eruption or they can appear till 5 years of age due to the growth of the jaw (Rant, 1970). Thus we can state that the second upper deciduous incisor from Mala Triglavca was in contact with the first incisor and not with the canine. The lower incisor from Viktorjev spodmol was in contact with both neighbouring teeth. Formation of an oval concavity on the upper deciduous incisor is unclear. Since its surface is smoothly polished at magnification, it is not a consequence of a brake off after death (in the ground). Regarding its shape and position it is probably not a developmental defect. It was formed during a prolonged time in comparison to wear facets or wear effect was greater. A more detailed analysis is needed to elucidate its origin. Obliquely running furrow with sharp edges on the labial surface of the upper incisor also cannot be a developmental defect but is due to the enamel braking, probably after death.

4. 5 CERVICAL ENAMEL LINE

The course of the cervical enamel line on the excavated incisors is in agreement with the statement of Woelfel and Scheid (2001) that on deciduous incisors the cervical enamel line is positioned more apically on the lingual than on the labial side. On the contrary, the cervical enamel line on all 13 extracted maxillary deciduous incisors was positioned on the same level lingually and labially. The inconsistency would be difficult to explain due to the lack of data about this detail in the published literature.

4. 5 SKLENINSKO-CEMENTNA MEJA

Potek skleninsko-cementne meje na izkopanih sekalcih se ujema z navedbo Woelfla in Scheida (2001), da leži skleninsko-cementna meja na lingvalni ploskvi mlečnih sekalcev bolj apikalno kakor na labialni. Ne sklada se pa z našimi izsledki, saj je bila skleninsko-cementna meja pri vseh 13 izdrtih zgornjih mlečnih sekalcih v isti višini lingvalno in labialno. O tej podrobnosti je v literaturi premalo podatkov in bi razliko težko pojasnili.

Mikroskopski potek skleninsko-cementne meje je na vsakem zobu raznolik in nepredvidljiv (Grossman in Hargreaves, 1991; Neuvald in Consolaro, 2000). Mikroskopski potek skleninsko-cementne meje je bil valovit na distalni aproksimalni ploskvi zgornjega sekalca iz Male Triglavce in na labialni ploskvi spodnjega sekalca iz Viktorjevega spodmola. Valovit potek skleninsko-cementne meje je opisan pri mlečnih in stalnih človeških zobeh (Fujita in Nakayama, 1941; Carlsen, 1968; Grossman in Hargreaves, 1991; Neuvald in Consolaro, 2000) in smo ga pogosto ugotovili na izdrtih mlečnih sekalcih.

4. 6 KORENINSKA RAZJEDA IN STAROST OTROK

Razjeda korenine mlečnega sekalca pri današnjih otrocih se prične pri približno štirih do petih letih starosti in postopoma napreduje do izpada zoba pri starosti 6-9 let (Woelfel in Scheid, 2001), ko je korenina v večjem delu ali v celoti resorbirana (Sahara in sod., 1993). Zametek stalnega sekalca leži lingvalno ob koreninski konici mlečnega predhodnika in izrašča v incizalni in labialni smeri, zato je ravnina koreninske razjede sprva poševna, šele, ko stalni sekalec zavzame bolj labialno lego pod mlečnim zobom, se razjeda zravna (Sicher in Bhaskar, 1972; ElNesr in Avery, 2002). Pri spodnjih mlečnih sekalcih ostane labialni del korenine pogosto nerazjeden in ravnina koreninske razjede do konca strmo poševna, stalni sekalec pa izraste lingvalno ob mlečnem predhodniku (Ten Cate, 1998).

Razjeda korenine pri izkopanih sekalcih je tipična, pri zgornjem sekalcu iz Male Triglavce vodoravna, pri spodnjem iz Viktorjevega spodmola poševna. Dolžina nerazjedene korenine pri zgornjem sekalcu iz Male Triglavce je približno 2 mm, zato je malo verjetno, da je zob izpadel po naravni poti oziroma sam od sebe. Bolj verjetno je izpadel po smrti. Tudi spodnji sekalec iz Viktorjevega spodmola glede na dolžino nerazjedene korenine verjetno ni izpadel spontano; če je njegov stalni naslednik izrastel lingvalno ob njem, kar je pogosto pri današnjih otrocih, je morda pri izpadu kdo pomagal (npr. starši), ker otroka takšno stanje moti, ali pa je izpadel po smrti. Na zobeh ni bolezenskih sprememb (zobna gniloba, sledovi poškodbe), ki bi lahko bile vzrok predčas-

The microscopic course of the cervical enamel line is variable and unpredictable on any one individual tooth (Grossman and Hargreaves, 1991; Neuvald and Consolaro, 2000). Scalloping of the cervical enamel line occurred on distal surface of the maxillary incisor from Mala Triglavca and on labial surface of the mandibular incisor from Viktorjev spodmol. Scalloping of the cervical enamel line was described at deciduous and permanent teeth (Fujita and Nakayama, 1941; Carlsen, 1968; Grossman and Hargreaves, 1991; Neuvald and Consolaro, 2000), and it was often present at the extracted deciduous incisors.

4. 6 ROOT RESORPTION AND AGE OF THE CHILDREN

Root resorption of the deciduous incisor with contemporary children starts at approximately 4-5 years of age and proceeds stepwise till the fall out of the tooth at 6-9 years of age (Woelfel and Scheid, 2001), when the root is to a greater part or nearly almost resorbed (Sahara et al., 1993). Permanent tooth germ lays lingually near the root apex of the deciduous tooth predecessor and erupts in the incisal and labial direction. Therefore the plane of root resorption is initially an angle and later, when permanent incisor takes more labial position under deciduous tooth, the root resorption level becomes horizontal (Sicher and Bhaskar, 1972; ElNesr and Avery, 2002). At lower deciduous incisors remains labial part of the root unresorbed frequently and the plane of root resorption steeply inclined till the end, permanent incisor erupts lingually at deciduous precursor (Ten Cate, 1998).

Root resorption at the excavated incisors is characteristic, at the upper incisor from Mala Triglavca horizontal, at the lower incisor from Viktorjev spodmol inclined. The lenght of non-resorbed root at the upper incisor from Mala Triglavca was approximately 2 mm, so it is less probable that the tooth was lost in the natural way or spontaneously, but was most probably lost after death. According to the length of the non-resorbed root the lower incisor from Viktorjev spodmol was also not lost spontaneously; if its permanent successor erupted lingually adjacent to it, this being frequent with contemporary children, probably somebody helped at its shedding (ie. parents), because such a situation is disturbing for a child, or it was lost after death. There were no pathological changes (caries, traces of trauma) presented as a possible cause of a pre-term loss. Rough root surface adjacent to the root canal at both excavated incisors is a consequence of osteoclastic activity and/or post-mortem changes in the ground (Werelds, 1967).

We tried to estimate the age of both children on the basis of temporal course of root resorption of deciduous teeth, determined on the basis of radiographs with American (Fanning, 1961), Indian (Nanda, 1969), Finne izgube. Hrapava površina korenine ob koreninskem kanalu pri obeh izkopanih sekalcih je posledica osteoklastične dejavnosti in/ali posmrtnih sprememb v zemlji (Werelds, 1967).

Starost obeh otrok smo poskušali oceniti na podlagi časovnega poteka koreninske razjede mlečnih zob, ki so ga na osnovi rentgenskih posnetkov določili pri ameriških (Fanning, 1961), indijskih (Nanda, 1969), finskih (Haavikko, 1973) in japonskih otrocih (Daito in sod., 1991). Potek koreninske razjede pri mlečnih zobeh je časovno precej nestanoviten in ni najboljša osnova za določanje starosti, ga pa kljub temu uporabljajo v ta namen pri analizi posameznih izoliranih mlečnih zob (Hillson, 1998). Razvoj mlečnih zob, in tudi razjeda njihovih korenin sta del otrokovega razvoja. Razlike v poteku razvoja med otroci so posledica genetskih razlik, spola, etnične pripadnosti, sprememb v hitrosti razvoja med populacijami iz različnih časovnih obdobij, prehrane, zdravstvenega stanja in podnebja (Kallay, 1974; Liversidge in sod. 1998). Pri indijskih otrocih, starih od 6 do 12 let, je koreninska razjeda mlečnih zob razen v začetnem obdobju pri spodnjih kočnikih zaostajala v primerjavi z razjedo korenin pri enako starih ameriških otrocih, v neketerih primerih za več kot dve leti (Nanda, 1969). Kot najverjetnejša vzroka za te razlike navajajo neustrezno prehrano in večjo obolevnost indijskih otrok zaradi slabih higienskih in zdravstvenih razmer, ki zavirajo razvoj zobovja in s tem tudi menjavo mlečnih in stalnih zob. Ker bioloških lastnosti in življenjskih razmer mezolitske populacije, ki sta ji otroka, katerih zoba smo določali, pripadala, ne poznamo, lahko njuno starost na osnovi razjede korenin ocenimo le približno.

Pri izračunu deleža razjedene korenine smo za celotno dolžino korenine vzeli povprečno dolžino za drugi zgornji in prvi spodnji mlečni sekalec po Ashu (1993): 11,4 mm in 9 mm. Pri zgornjem sekalcu iz Male Triglavce je dolžina nerazjedene korenine 2,3 mm, torej manjka približno 80 % zobne korenine. Pri spodnjem sekalcu iz Viktorjevega spodmola je koreninska razjeda poševna: dolžina korenine lingvalno, kjer je razjedenost največja, je 0,8 mm, labialno 3,4 mm, torej manjka 62-91 % zobne korenine.

Pri večini japonskih otrok doseže koreninska razjeda zgornjega drugega sekalca vratno četrtino korenine v starostnem obdobju med 5 in 8,5 leta (Daito in sod. 1991), pri večini finskih otrok med 6 in 8 let (Haavikko, 1973) in pri večini ameriških deklic med 6 in 9 let (Fanning, 1961). Povprečna starost indijskih otrok s 75 do 88 % razjedene korenine zgornjega drugega sekalca je približno 8,5 leta (Nanda, 1969). Na osnovi teh podatkov domnevamo, da je bil otrok, ki mu je pripadal sekalec iz Male Triglavce, star med 5 in 9 let.

Koreninska razjeda spodnjega sekalca doseže pri večini japonskih otrok vratno četrtino korenine v starostnem obdobju med 4 in 7,5 leta (Daito in sod, 1991), pri večini finskih otrok med 4,5 in 8 let (Haavikko, 1973),

nish (Haavikko, 1973) and Japanese (Daito et al., 1991) children. Timing of root resorption in deciduous teeth shows considerable variations and is not the best basis for age estimation but, in spite of that, it is used in the study of isolated deciduous teeth (Hillson, 1998). Development of deciduous teeth and their root resorption are part of the child's development. Differences in the course of development between children are the consequence of genetic differences, sex, ethnic groups, changes in the developmental rate between populations from different time periods, nutrition, health, and climate (Kallay, 1974; Liversidge et al., 1998). With Indian children from 6-12 years the root resorption of deciduous teeth except in the beginning period at lower molars lagged in comparison to root resorption with American children of the same age, in some cases even for more than 2 years (Nanda, 1969). The most probable reasons for these differences are the lack of proper nutrition, greater frequency of illness due to poor conditions of hygiene and health with Indian children retarding development of dentition and thus also replacement of deciduous teeth with their permanent successors. Because we do not know anything about biological characteristics and life circumstances of Mesolithic population to which both children, whose teeth were analysed, belonged, we could estimate their age only approximately from their root resorption.

The proportion of root resorption was calculated on the basis of the average length of the root for the second upper and the first lower deciduous incisor according to Ash (1993): 11.4 mm and 9 mm. With the upper incisor from Mala Triglavca the length of unresorbed root was 2.3 mm, so approximately 80 % of root is missing. With the lower incisor from Viktorjev spodmol the root resorption is oblique: the root length lingually, where resorption was maximal, was 0.8 mm, labially 3.4 mm, so 62-91 % of root is missing.

At the majority of Japanese children root resorption of the second upper incisor reaches cervical quarter of the root in the age period between 5 and 8.5 years (Daito et al., 1991), at the majority of Finnish children between 6 and 8 years (Haavikko, 1973) and at the majority of American girls between 6 and 9 years (Fanning, 1961). The average age of Indian children with 75-88 % resorbed root of the upper second incisor was approximately 8.5 years (Nanda, 1969). On the basis of these data we hypothesize that the child to whom the incisor from Mala Triglavca belonged was between 5 and 9 years old.

At the majority of Japanese children root resorption of the lower incisor reaches cervical quarter of the root in the age period of 4-7.5 years (Fanning, 1961) at the majority of Finnish children between 4,5 and 8 years (Haavikko, 1973) and at the majority of American girls between 5 and 9 years (Fanning, 1961). The average age of Indian children with 60-90 % root resorption of the lower incisor was between 7 and 9 years (Nanda, 1969).

pri večini ameriških deklic pa med 5 in 9 let (Fanning, 1961). Povprečna starost indijskih otrok s 60 do 90 % razjedene korenine spodnjega sekalca je med 7 in 9 let (Nanda, 1969). Na osnovi teh podatkov domnevamo, da je bil otrok, ki mu je pripadal sekalec iz Viktorjevega spodmola, star med 4 in 9 let.

4. 7 BOLEZENSKE SPREMEMBE NA ZOBEH

Razpokanost sklenine izkopanih zob je bila podobna kakor pri izdrtih mlečnih zobeh in ni bolezenski pojav. Točkaste razjede na mezialni ploskvi korenine zoba iz Male Triglavce bi težko nastale zaradi osteoklastične dejavnosti v sklopu koreninske razjede in so verjetneje posmrtne spremembe, ki se v zemlji začnejo dogajati zelo zgodaj in so makroskopsko opazne najpozneje po treh letih (Werelds, 1967).

Negenetske hipoplazije sklenine mlečnih zob so lahko posledica bolezni matere v času nosečnosti, poškodb novorojenca ob porodu in bolezni otroka ali neustrezne prehrane v prvem letu življenja (Hillson, 1998). Razvojne napake sklenine mlečnih zob so redke pri lovcih in nabiralcih iz predzgodovinskega obdobja (Cook in Buikstra, 1979). Tudi sklenina zob, izkopanih v Mali Triglavci in v Viktorjevem spodmolu, je bila gladka, brez hipoplazij in izrazitih perikimacij. To bi lahko pomenilo odsotnost stresov v drugi polovici nosečnosti in prvih mesecih življenja, to je v času, ko nastaja sklenina mlečnih sekalcev (Lunt in Law, 1974). Domnevamo pa tudi, da zdrava, nehipoplastična sklenina morda kaže takratno stanje, ko so se rodili in preživeli le zdravi in proti zunanjim škodljivim vplivom odporni otroci.

5 SKLEP

V študiji smo ugotovili, da izkopana zoba po oblikovnih, merskih in rentgenoloških lastnostih ustrezata človeškim mlečnim sekalcem. Zob iz Male Triglavce je zgornji levi, najverjetneje drugi sekalec. Zob iz Viktorjevega spodmola je spodnji levi sekalec in glede na velikost zobne krone sodi k prvim sekalcem, po nekaterih oblikovnih lastnostih pa bi bil lahko drugi sekalec. Zoba najverjetneje nista izpadla po naravni poti za časa življenja, temveč po smrti. Domnevamo, da je zgornji sekalec iz Male Triglavce pripadal 5-9 let staremu otroku, spodnji sekalec iz Viktorjevega spodmola pa 4-9 let staremu otroku. Negotovosti pri natančni uvrstitvi obeh zob so v znatni meri posledica še vedno premalo raziskanih oblikovnih in merskih značilnosti mlečnih zob, posebno njihove variabilnosti.

On the basis of these data we hypothesize that the child to whom the incisor from Viktorjev spodmol belonged was between 4 and 9 years old.

4. 7 PATHOLOGICAL CHANGES ON THE TEETH

Enamel cracking of the excavated teeth was similar to those found in the extracted deciduous incisors and it is not a pathological phenomenon. Pitted erosions on the mesial surface of the root from Mala Triglavca could hardly be due to the osteoclastic activity in the connection with the root resorption and they are most probably post-mortem changes, occurring early in the ground and are macroscopically visible after 3 years at the latest (Werelds, 1967).

Non-genetic hypoplasia of deciduous teeth can be due to the illness of the mother during the pregnancy, trauma of the newborn during the partition and diseases or inadequate nutrition in the first year of the child's life (Hillson, 1998). Developmental enamel defects of deciduous teeth are rare with hunters and gatherers from prehistoric time (Cook and Buikstra, 1979). Enamel of the teeth excavated in Mala Triglavca and Viktorjev spodmol is also smooth, without hypoplasia and distinctive perykimata. These could mean the absence of stress during the second part of the pregnancy and during the first months of life, ie. during the time when enamel of deciduous incisors forms (Lunt and Law, 1974). We also hypothesize that healthy non-hypoplastic enamel may reflect the conditions of that time, when only healthy children resistant to external noxious influences were born and also survived.

5 CONCLUSION

In the present study we discovered that the excavated teeth according to their morphological, metrical, and radiographic characteristics correspond to human deciduous incisors. The tooth from Mala Triglavca is an upper left, most probably second incisor. The tooth from Viktorjev spodmol is a lower left incisor and according to the size of the crown corresponds to the first incisor, according to some morphological features it could be the second incisor. Both teeth were most probably not lost naturally during the lifetime, but after death. We hypothesize that the upper incisor from Mala Triglavca belonged to 5-9 years old child, and the lower incisor from Viktorjev spodmol to 4-9 years old child. Uncertainties regarding accurate determination of teeth are to a great extent the consequence of still not sufficiently investigated morphological and metrical characteristics of deciduous teeth, especially of their variability.

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Dodatek 2 / Annex 2

^{14}C DATACIJE VIKTORJEVEGA SPODMOLA IN MALE TRIGLAVCE

IVAN TURK

Ker je radiometrično določanje starosti postalo nujno zlo, sem se, kljub pomislekom (glej Turk, ta zbornik) odločil za preizkus starosti z metodo ^{14}C. V ta namen sem izbral tri vzorce v Viktorjevem spodmolu in enega v M. Triglavci (razpredelnica 1). Vzorce so datirali v Beta Analytic Inc., v Miamiju na Floridi, ZDA, z uporabo AMS-tehnike.

^{14}C datume v razpredelnici 1 najlažje primerjam s podatki za severno Italijo (Trentino Alto Adige), kjer je za obdobje od vključno konca paleolitka do vključno neolitika doslej zbranih več kot sto takšnih datumov (Dalmeri, Lanzinger 1998, 15) in kjer je bil razvoj mezolitika domnevno podoben (ali vsaj najbolj podoben) razvoju mezolitika v zahodni Sloveniji.

^{14}C datumi za Viktorjev spodmol kažejo, da so datirane najdbe iz obdobja sovterjena: školjka in los iz starejše faze ter šilo iz mlajše faze (glej Alessio *et al.* 1983, 249; Gob 1990). V Pečini pri Bjarču je ^{14}C datum za finalni epigravetjen 11100±125 BP, zaradi česar se ta uvršča v alered - *allerød* (Guerreschi 1996, 133). Ta je datiran od 11.700-10.800 BP oz. 11.930-10.860 BP (Broglio, Improta 1995, 26, 28). Ker aleredu sledi še kratko hladno obdobje, t. i. drijas - *dryas* III, bi bile lahko nekatere najdbe v Viktorjevem spodmolu iz začetka preboreala, tj. v času od 9800-9500 BP (prav tam 29). Če to drži, je najdišče arheološko zelo pomembno, ker omogoča analizo stanja na meji pleistocen/holocen in na prehodu poznega epigravetjena v sovterjen.

V sosednji Italiji bi bili Viktorjevemu spodmolu po ^{14}C kronologiji časovno blizu Riparo Soman, Pečina pri Bjarču (Broglio, Improta 1995, 34-35, tab. 1; Guerreschi 1996) in Stenašca (Biagi, Spataro 1999-2000, 32 ss), v hrvaškem delu Istre pa Pupićina peć (Miracle 1997). Arheološke najdbe iz teh najdišč v obsegu, kot so objavljene, niso najbolje primerljive z gradivom iz Viktorjevega spodmola. Vendar obstajajo določene povezave kot je slaba zastopanost trapezov, mikro vbadal, trikotnikov in segmentov (glej Battaglia *et al.* 1992, 293-297). Povezovalni element 'arhaične narave' pa bi lahko bila tudi nenavadna mikro klinica ali konica s pecljem (t. 3: 33).

Na podlagi ^{14}C datuma za šilo (t. 7. 114/15) tudi izhaja, da je del najdb v Viktorjevem spodmolu lahko

^{14}C DATING OF VIKTORJEV SPODMOL AND MALA TRIGLAVCA

Since radiometric dating has become a necessary evil, despite misgivings (see Turk, this volume) I decided to test age by the ^{14}C method. I chose three samples in Viktorjev spodmol for this purpose and one in M. Triglavca (Table 1). The samples were dated at Beta Analytic Inc., in Miami in Florida, US, with the use of the AMS-technique.

^{14}C dates in Table 1 are most easily compared to data for northern Italy (Trentino Alto Adige), where for the period from the end of the Palaeolithic to the Neolithic, inclusive, more than a hundred such dates have been collected (Dalmeri, Lanzinger 1998, 15) and where the development of the Mesolithic was presumably similar (or at least most similar) to the development of the Mesolithic in western Slovenia.

^{14}C dates for Viktorjev spodmol show that finds are dated to the period of the Sauveterrian: the shells and the moose from the older phase and the awl from the younger phase (see Alessio *et al.* 1983, 249; Gob 1990). In Pečina pri Bjarču, the ^{14}C date is for the final Epigravettien 11,100±125 BP, because of which it is placed in the Allerød (Guerreschi 1996, 133). This is dated from 11,700-10,800 BP or 11,930-10,860 BP (Broglio, Improta 1995, 26, 28). Since the Allerød is followed by short cold period, Dryas III, some of the finds in Viktorjev spodmol could be from the start of the Preboreal, i.e., in the period from 9800-9500 BP (ibid 29). If this is true, the site is very important to archaeology because it enables an analysis of conditions on the boundary of the Pleistocene/Holocene and at the transition of the Late Epigravettien to the Sauveterrian.

In neighbouring Italy, according to ^{14}C chronology, Riparo Soman, Pečina pri Bjarču (Broglio, Improta 1995, 34-35, tab. 1; Guerreschi 1996) and Stenašca (Biagi, Spataro 1999-2000, 32 ss), would be close in time to Viktorjev spodmol and in the Croatian part of Istria Pupićina peć (Miracle 1997). Archaeological finds from these sites to the extent that they have been published are not the most comparable with material from Viktorjev spodmol. However, specific links exist between them, such as poorly represented trapezes, microburins, triangles and segments (see Battaglia *et al.* 1992, 293-297). An unusual microbladelet or stemmed point (Plate 3: 33) could also be a linking element of an "archaic" nature.

Razpredelnica 1: Vzorci in rezultati.
Table 1: Samples and results.

Oznaka vzorca Sample label	Najdišče Site	Plast / reženj Layer / spit	Material Material	Teža Weight	13C/12C	Starost* Age* BP±1σ
MT 1 (Beta–784795)	M. Triglavca	Mezolitska plast Mesolithic layer	Školjka *Mytilus g.* Bivalve *Mytilus g.*	1,2 g	–4.4 o/oo	4080±40
VS 6 (Beta–184796)	V. spodmol	Reženj 6 Spit 6	Premolar *Alces a.* (sl. 16.3) Premolar *Alces a.* (Fig.. 16.3)	> 5 g	–20.4 o/oo	9930±50
VS 15 (Beta–184797)	V. spodmol	Reženj 15 Spit 15	Kost (šilo, t.7:114/15) Bone (awl, Plate 7:114/15)	2,3 g	–22.1 o/oo	8300±50
VS 16 (Beta–184798)	V. spodmol	Reženj 16 Spit 16	Školjka *Mytilus g.* Bivalve *Mytilus g.*	0,6 g	–3.5 o/oo	9560±60

* Izmerjena ^{14}C starost.
* Measured ^{14}C age.

borealne starosti in da te najdbe pripadajo mlajši sovterjenski fazi v najdišču. Ta faza je v sosednji Italiji bogato zastopana, med drugim tudi na Tržaškem krasu na podlagi ^{14}C datumov za Stenašco - *Grotta dell'Edera* in Pečino v Sedlu - *Grotta Benussi* (Biagi, Spataro 1999-2000; Alesio *et al.* 1983), pri nas pa bi ji glede na stratigrafijo in ^{14}C kronologijo lahko pripadal spodnji nivo na mezolitskem najdišču Breg (glej Mlekuž 2001, 47, sl. 4).

^{14}C datum za M. Triglavco ne kaže, da je školjčna lupina mezolitske starosti, temveč govori o njeni mlajši, eneolitski starosti.

^{14}C datumi za Viktorjev spodmol in M. Triglavco niso enoznačni in zahtevajo dopolnilno razlago, sicer se lahko zapletem v krožno argumentiranje.

Nobenega dvoma ni, da je ^{14}C datum za ponovno pregledane sedimente, odkopane v M. Triglavci, napačen. Sedimenti so namreč po mnenju izkopavalcev pripadali t. i. mezolitski plasti, ki je bila stratigrafsko ločena od neolitskih in eneolitskih plasti. Pri ponovnem pregledu so bili najdeni večinoma mezolitski izdelki, podobni tistim v Viktorjevem spodmolu, ki so lahko rahlo, v nobenem primeru pa ne enkrat mlajši. Razen tega so bile v pregledanih sedimentih ugotovljene podobne malakofavna, herpetofabna in sesalska mikrofavna kot v Viktorjevem spodmolu. Zakaj je datum napačen, je težko ugotoviti, vendar odgovor na to vprašanje ni pomemben. Kaže, da pri izbiri vzorca nisem imel srečne roke. Glede na okoliščine, v katerih je bilo mezolitsko gradivo pridobljeno, me datum, ki lahko kaže, da so tudi v eneolitiku nabirali školjke na obali Jadranskega morja, ne preseneča.

^{14}C datumi za Viktorjev spodmol so bolj enoznačni, vendar so moteči kronološki obrati.

Zob losa v režnju 6 t. i. raziskovalne faze IzA ima konvencionalno starost[1] 10.010±50 let BP, koščeno šilo v režnju 15 pa 8350±50 let BP. Šilo je zato 1660 konven-

[1] Konvencionalna ^{14}C starost je korigirana izmerjena starost, ki služi za kalibriranje ^{14}C starosti v koledarska leta. V tem zborniku namenoma ne uporabljamo kalibriranih ^{14}C datumov, da ne bi vnesli v kronologijo še več zmede kot jo že itak imamo.

On the basis of ^{14}C dates for the awl (Plate 7. 114/15) it also follows that part of the finds in Viktorjev spodmol may be of Boreal age and that these finds belong to the late Sauveterrian phase at the site. This stage is richly represented in neighbouring Italy, including on the Triestine Karst on the basis of ^{14}C dating for Stenašca - *Grotta dell'Edera* and Pečina v Sedlu - *Grotta Benussi* (Biagi, Spataro 1999-2000; Alesio *et al.* 1983), and with us in view of the stratification and ^{14}C chronology the lower level in the Mesolithic site at Breg may have belonged to it (see Mlekuž 2001, 47, Fig. 4).

The ^{14}C date for M. Triglavca does not indicate that the shell is of Mesolithic age, but later, Eneolithic.

The ^{14}C dates for Viktorjev spodmol and M. Triglavca are not in correspondence and require further explanation, although one risks circular argument. There is no doubt that the ^{14}C date for the re-examined sediments excavated in M. Triglavca is wrong. In the opinion of the excavators, the sediments belong to the Mesolithic layer, which was stratigraphically distinct from Neolithic and Eneolithic layers. The majority of the Mesolithic finds were made during re-examination of the sediments, similar to those in Viktorjev spodmol, and are certainly not twice as young. In addition, similar malacofauna, herpetofauna and mammal microfauna were found in the examined sediments as in Viktorjev spodmol. It is difficult to say why the date is wrong, but the answer to that question is not important. It seems that I was unlucky in the choice of sample. In view of the circumstances in which the Mesolithic material was obtained, information that may show that they also collected shells on the shore of the Adriatic in the Eneolithic does not surprise me.

The ^{14}C dates for Viktorjev spodmol correspond better, but they are disturbing chronological inversions.

The moose tooth in spit 6 of the so-called investigative IzA phase has a conventional age of [1] 10,010±50

[1] Conventional ^{14}C age is the corrected measured age which serves for calibrating ^{14}C age in the calendar years. We are intentionally not using calibrated ^{14}C dates in this publication

cionalnih ^{14}C let mlajše, čeprav je bilo najdeno 40 cm globlje kot zob.

Školjčna lupina v režnju 16 ima konvencionalno starost 9910±60 let. Kljub pričakovani približno enaki starosti šila in školjčne lupine, ki izhajata iz istega stratigrafskega nivoja, je razlika 1560 konvencionalnih ^{14}C let. Po drugi strani pa je med zobom losa in školjčno lupino kljub stratigrafski razliki 45 cm samo 100 konvencionalnih ^{14}C let razlike.

Velike razlike v konvencionalnih ^{14}C letih lahko koga navedejo na misel, da sta v Viktorjevem spodmolu dva nivoja mezolitske poselitve, ki sta med seboj premešana. Vendar razpoložljivi sedimentološki podatki in podatki o malih sesalcih govorijo o tem, da se sedimenti plasti 2 in 3 po mlajši mezolitski fazi (nekako po režnju 10) niso več mešali (glej Turk, ta zbornik; Kryštufek in Toškan, ta zbornik). Vsekakor bi bilo za osvetlitev tega vprašanja treba narediti natančno sedimentološko analizo. Sklepati zgolj na podlagi datacij najdb o njihovi premešanosti in posledično o premešanosti sedimentov je tvegano početje, saj so lahko tudi drugi vzroki za inverzijo radiometričnih datumov. Med temi je lahko na prvem mestu diageneza sedimentov in njen vpliv na diagenezo najdb organskega izvora. Diageneza se običajno povezuje s spremembami v mineralni sestavi, vendar se njen vpliv na organske komponente ne more *a priori* izključiti (prim. Amossé *et al.* 1987; Turk *et al.* 2003). Različni materiali imajo domnevno tudi različno diagenezo. Tako so kosti in zobje (zlasti sklenina) manj občutljivi na diagenetske spremembe kot školjke, od katerih so morske manj občutljive kot kopenske. Posebno vlogo ima tudi sedimentno mikrookolje, od katerega so odvisni diagenetski procesi v snoveh organskega izvora.

Pri datiranih vzorcih v Viktorjevem spodmolu me je presenetila njihova velika starost. Običajni so primeri, ko so ^{14}C starosti zaradi kontaminacije z modernim ogljikom pomlajene (to bi bilo eventualno možno pri vzorcu v M. Triglavci). Obratni primeri so redkost (Évin 1987). Visoka ^{14}C starost Viktorjevega spodmola ni skladna s tipološko sestavo najdb. Prečno retuširani mikroliti se v zahodni Evropi pojavijo šele v drijasu III, tipični trapezi pa okoli 7800 BP (Rozoy 1990, 26). V Viktorjevem spodmolu so bili trapezi najdeni v režnjih 10, 12 in 16, mikro vbadala pa v režnjih 6–10, kar je glede na ^{14}C datume najmanj 500 let in največ 2210 let prezgodaj. Celoten mezolitski inventar v Viktorjevem spodmolu je nepričakovano razvit za čas neposredno po drijasu III, če ga primerjam z razvojnimi fazami v zahodni Evropi in Sredozemlju. To lahko pomeni dvoje: ali da so ^{14}C datumi za Viktorjev spodmol napačni (postarani zaradi izluževanja ogljika iz kolagena in školjčnih lupin?) ali da je razvoj na območju slovenskega primorja prehiteval razvoj v zahodni Evropi in preostalem Sredozemlju. Za katero koli varianto se odločimo, so posledice neprijetne. Napačni datumi bi pomenili, da so se napake dogajale že pred tem in da se je stroka vrtela v krogu

BP, and the bone awl 8350±50 BP. The awl is therefore 1660 conventional ^{14}C years younger, although it was found 40 cm deeper than the tooth.

The mollusc shell in spit 16 has a conventional age of 9910±60 years. Despite the expected approximately similar age of the awl and the shell, which come from the same stratigraphic level, the difference is 1560 conventional ^{14}C years. On the other hand, there is only a difference of 100 conventional ^{14}C years between the moose tooth and the mollusc shell, despite a stratigraphic difference of 45 cm.

The great difference in conventional ^{14}C years would suggest that there were two levels of Mesolithic settlement in Viktorjev spodmol. However, the available sedimentological data and data on small mammals suggest that the sediments of layer 2 and layer 3 are no longer mixed after the late Mesolithic phase (somewhere after spit 10; see Turk, this volume; Kryštufek and Toškan, this volume). In any case, to settle the matter would certainly require a careful sedimentological analysis. To reach conclusions merely on the basis of dating of finds showing their mixture and consequently showing the mixing of sediments is a risky business, since there could also be other reasons for the inversion of the radiometric dates. Foremost of these is the diagenesis of the sediments and its impact on the diagenesis of finds of organic origin. Diagenesis is normally connected with changes in the mineral composition, but an effect on organic components cannot be *a priori* excluded (see Amossé *et al.* 1987; Turk *et al.* 2003). Various materials also presumably have different diageneses. So bones and teeth (especially enamel) are less sensitive to diagenetic change than shells, of which seashells are less sensitive than those of land snails. The sedimentary micro-environment also has a particular role, on which diagenetic processes in substances of organic origin depend.

In the dated samples in Viktorjev spodmol, their great age surprised me. There are normally cases when, because of contamination with modern charcoal, ^{14}C ages are too young (this may be the case with the sample from M. Triglavca). Inverse cases are rare (Évin 1987). The high ^{14}C age of Viktorjev spodmol does not accord with the typological composition of the finds. Truncated microliths only appear in western Europe in Dryas III, and typical trapezes around 7800 BP (Rozoy 1990, 26). In Viktorjev spodmol, trapezes were found in spits 10, 12 and 16, and microburins in spits 6–10, which in relation to the ^{14}C date is at least 500 and a maximum of 2210 years too early. The whole Mesolithic inventory in Viktorjev spodmol is unexpectedly developed for the period immediately after Dryas III, if it is compared with development phases in Western Europe and the Mediterranean. This could mean two things:

so as not to bring even more confusion to the chronology than we already have.

tipologije in radiometrije. Pravilni datumi bi postavili na glavo vse dosedanje mezolitske razvojne sheme. Kompromisne rešitve so sicer možne, vendar, dolgoročno gledano, ne koristijo nikomur.

V zvezi s ^{14}C datumi v Viktorjevem spodmolu, če so seveda pravilni, se postavlja še eno vprašanje: vprašanje trajanja mezolitske poselitve.

Teoretično bi bil spodmol lahko poseljen skoraj 1700 let, kar je zelo dolga doba v primerjavi z debelino sedimentov, ki znaša slabih 50 cm. Takšna domneva je podprta z veliko gostoto vseh vrst najdb. Vendar kljub dolgi poselitvi ni mogoče zaznati razvoja v običajnem tipološko-arheološkem smislu. Lahko pa je zaznati vezni prehod (razvoj) vsaj dveh, treh geometričnih oblik (klinic s hrbtom in prečno retušo, trikotnikov in trapezov) iz ene v drugo.

Druga možnost je, da je bil spodmol močno poseljen večkrat za kratek čas, z večjimi časovnimi razmiki med posameznimi poselitvami. Tudi v tem primeru ni mogoče zaznati razvoja oz. razlik med različnimi poselitvami, čeprav bi tokrat pričakovali, da bodo razlike očitnejše zaradi poselitvenih vrzeli in umetno prekinjenega razvoja.

Jedro problema vidim v vprašanju, kako enačiti fizični čas, ki ga predstavljajo ^{14}C datumi, s stratigrafsko enoto, ki jo predstavlja 50 cm debela plast sedimentov oz. 5 cm debeli režnji, ki jih lahko enačim s sedimentacijskimi nivoji (glej Turk 2003). Posamezna datirana najdba evidentno ne predstavlja dobro časa oz. časovnega horizonta, v katerem je nastala, se razvijala in se stabilizirala neka stratigrafska enota, ki ji ta najdba pripada. Za pravilno povezavo mezolitske stratigrafske enote v Viktorjevem spodmolu s časovnim horizontom bi bilo treba datirati večje število skrbno izbranih najdb (npr. 30 ostankov različne lovne favne in druge hrane), vse ob predpostavki, da bi bili vsi ^{14}C datumi pravilni.

Kompromisno enačenje kronoloških in stratigrafskih enot, s katerim se obide bistvo problema, je cenen izhod v sili, brez bodočnosti.

V povezavi s ^{14}C datumi v Viktorjevem spodmolu se postavlja v novo luč tudi vprašanje, kakšna je bila povezava med mezolitskimi kompleksi na Krasu in transgresijo Jadranskega morja v holocenu. Znano je, da so raziskovalci tržaškega mezolitika to zvezo uporabili za relativno datiranje kraških jamskih najdišč, ki jih razvrščajo glede na oddaljenost od morske obale in s tem povezano večjo ali manjšo pojavnostjo morskih školjk v njih. S takšno razlago se ne skladajo rezultati raziskav v Viktorjevem spodmolu, ki je znatno oddaljen od sedanje obale (bolj oddaljena je samo Pečina pri Bjarču, kjer je bilo najdenih več vrst morskih polžev in školjk), vendar vsebuje ostanke užitnih morskih školjk. Te so z metodo ^{14}C neposredno datirane v sam začetek mezolitika (preboreal) (razpredelnica 1), ko je bila obala zaradi pleistocenske regresije nekoliko južneje od skrajnega južnega rta Istre (Kamenjaka) (Correggiari *et al.*

either the ^{14}C dates for Viktorjev spodmol are wrong (too old because of the leaching of carbon from collagen and shell?) or development on the territory of the Slovene coastal region overtook development in Western Europe and the remainder of the Mediterranean. The implications of whichever variant we choose are unpleasant. Wrong dates would mean that errors have occurred before this and the profession has been in a whirl of typology and radiometry. The right dates would set on their heads all the present Mesolithic development schemes. Compromise solutions are always possible but of no use to anyone in the long term.

In connection with ^{14}C dates in Viktorjev spodmol, if of course they are correct, another question is raised: that of the duration of Mesolithic settlement.

Theoretically, the overhang could have been settled for almost 1700 years, which is a very long period in view of the thickness of sediment, which amounts to slightly less than 50 cm. Such a possibility is supported by the high density of all types of find. However, despite long settlement, it is impossible to note development in the normal typological-archaeological sense. One can conceive a continuous transition (development) of at least two, three geometric shapes (truncated backed bladelets, triangles and trapezes) from one to another. The other possibility is that the overhang was intensively settled several times for a short period each, with major breaks in time between individual settlements. Even in this case it is not possible to mark development or difference among the various settlements, although we would expect in this case the differences to be clearer because of the settlement gaps and artificially disrupted development.

The core of the problem is how to equate the physical time given by the ^{14}C dates, with stratigraphic units represented by a 50 cm thick layer of sediments or 5 cm thick spits, which can be equated with sedimentation levels (see Turk 2003). Individually dated finds clearly do not provide a good time or temporal horizon in which some stratigraphic unit to which the find belongs was created, developed and stabilised. For properly linking Mesolithic stratigraphic units in Viktorjev spodmol with time horizons, a larger number of carefully chosen finds (e.g., 30 remains of various game and other food) would have to be dated, all on the presumption that all the ^{14}C dates were correct.

Compromise equation of chronological and stratigraphic units by which the problem is essentially avoided, is a cheap way out with no future.

In connection with ^{14}C dates in Viktorjev spodmol, new light is also shed on the question of the connection between Mesolithic complexes on the Karst and transgression of the Adriatic Sea in the Holocene. It is known that researchers of the 'Triestine Mesolithic' used this link for the relative dating of Karst cave sites, which they classified in relation to distance from the sea coast and, in this connection, the greater or lesser appearan-

1996) ali približno 100 km zračne črte od Viktorjevega spodmola. Sedanjo obalo je morje doseglo šele v atlatski dobi (pribl. 7000 BP), v času poznega mlajšega mezolitika (kastelnovjena).

Kritična analiza ^{14}C datumov je pokazala, da radiometrija ni veliko prispevala k rešitvi kronološkega vprašanja, celo obratno, vprašanje kronologije mezolitskih najdišč v zahodni Sloveniji se je še bolj zapletlo. Reševanje problema vidim v celostnem pristopu, ki je dolgotrajen postopek in zato zelo zelo drag. Kljub vsemu ni nobenega zagotovila, da bo problem na koncu uspešno rešen.

ce of seashells in them. The results of research in Viktorjev spodmol do not fit such reasoning, which is markedly distant from the then shore (only Pečina pri Bjarču is more distant, where a number of species of seashells and snails were found), but contains the remains of edible seashells. These have been directly dated by ^{14}C methods to the very start of the Mesolithic (Preboreal) (Table 1) when, because of the Pleistocene regression the shore was slightly south of the extreme southern tip of Istria (Kamenjak) (Correggiari *et al.* 1996) or approximately 100 km as the crow flies from Viktorjev spodmol. The sea only attained the present shoreline in the Atlantic period (approx. 7000 BP), at the time of the final Late Mesolithic (Castelnovian).

Critical analysis of ^{14}C dates has shown that radiometry has not contributed the solution to chronological questions. On the contrary, questions of the chronology of Mesolithic sites in western Slovenia has become even more complicated. I see the solution to this problem in an overall approach, which is a lengthy procedure and so very, very expensive. And with no guarantee that the problem will be successfully solved in the end.

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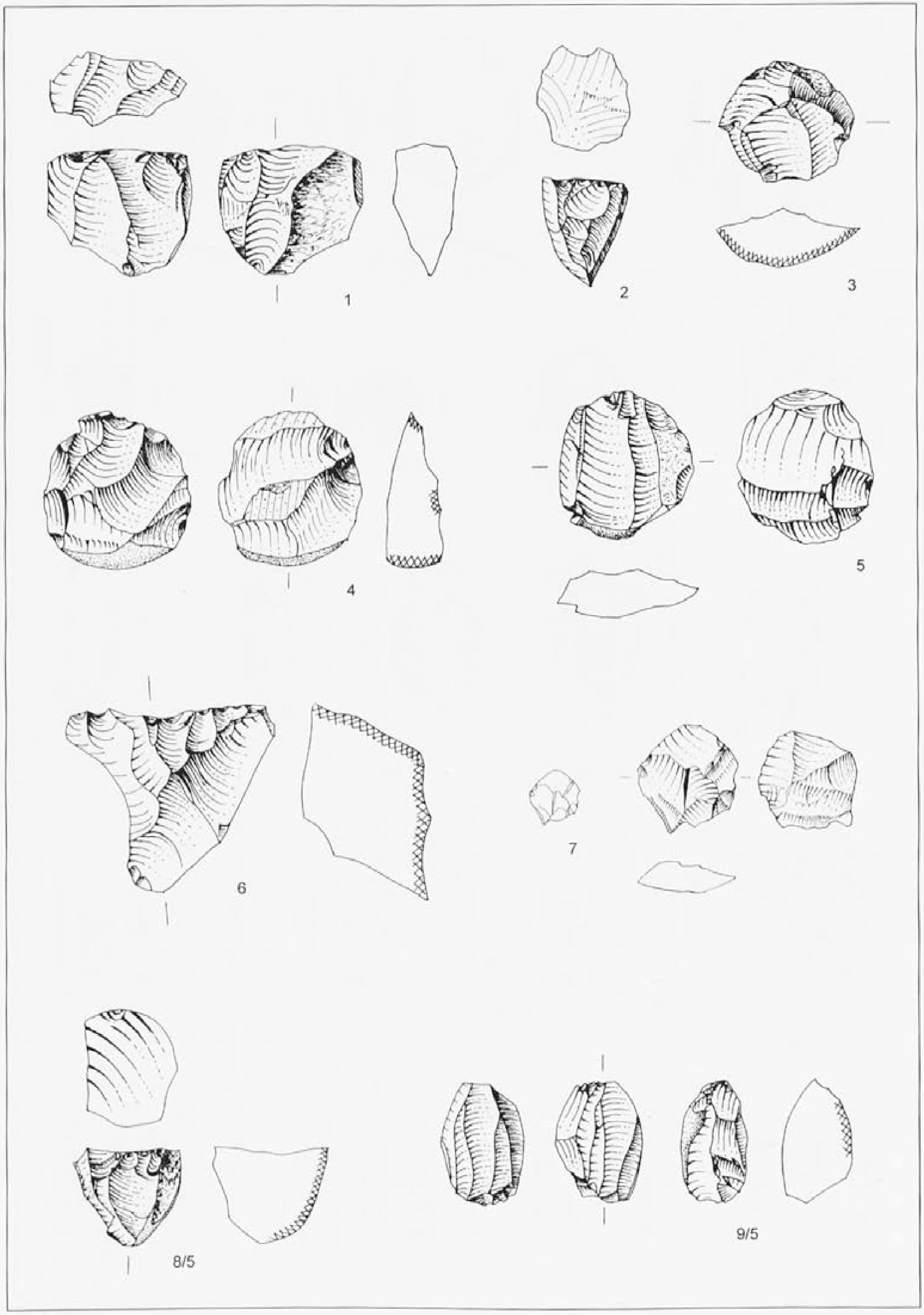
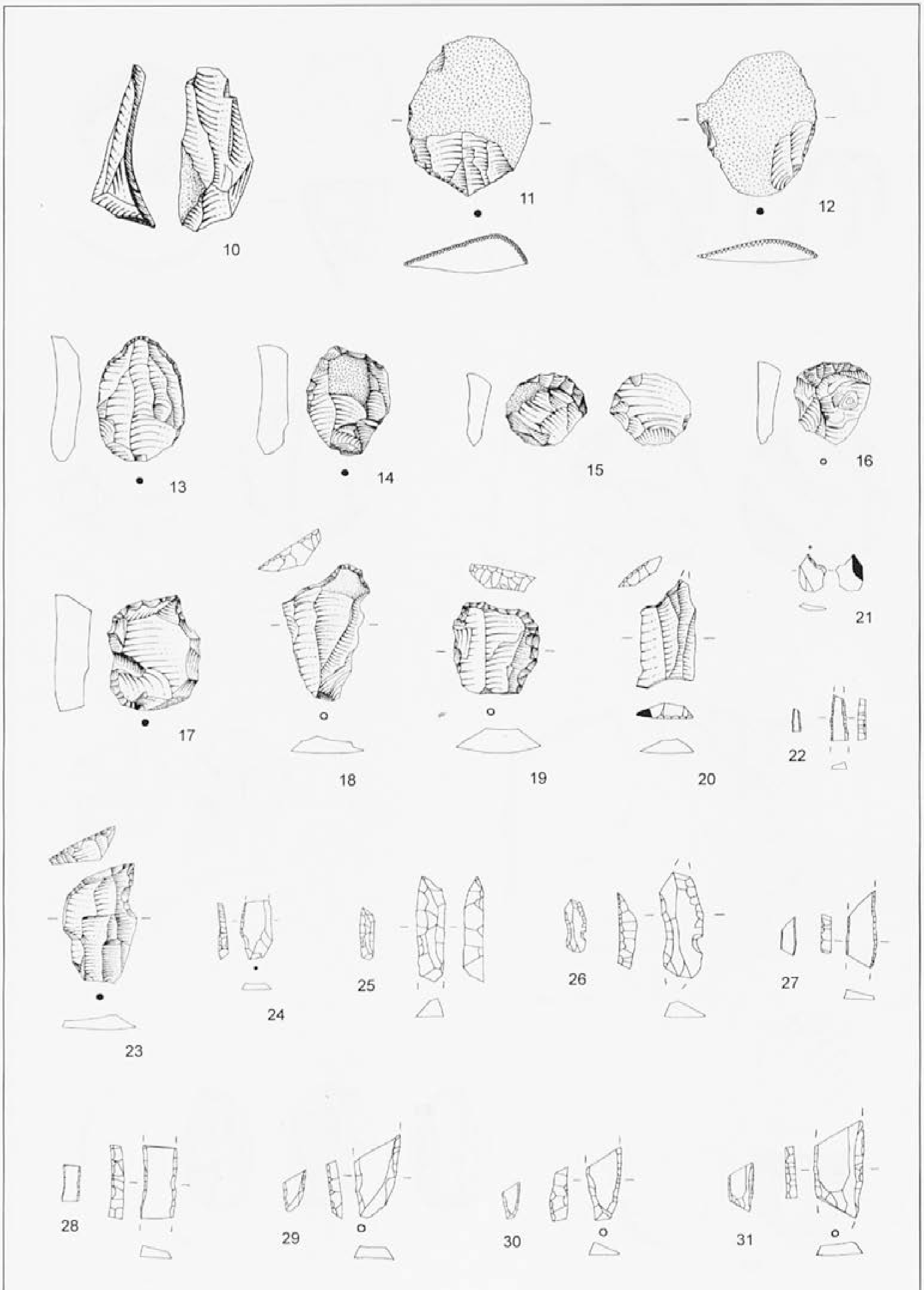
TABLE / PLATES 1–20

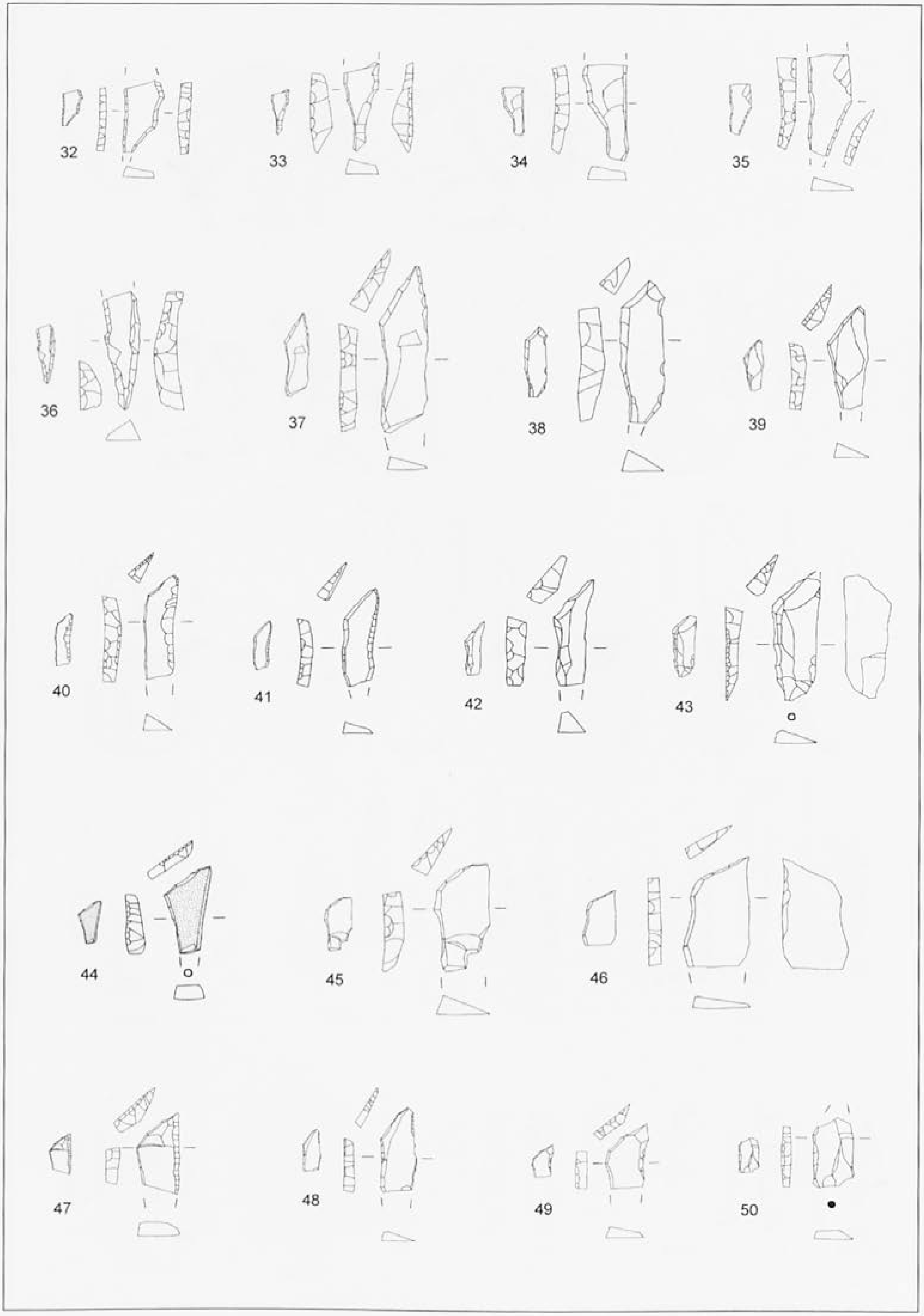


T. 1: Viktorjev spodmol, jedra, fazi Viktor in Viktor+IzA. Vse 1:1, štev 7 tudi 2:1. Risbe I. Turk. (Pojasnilo k tablam: Številke na tablah so inventarne številke predmetov.)

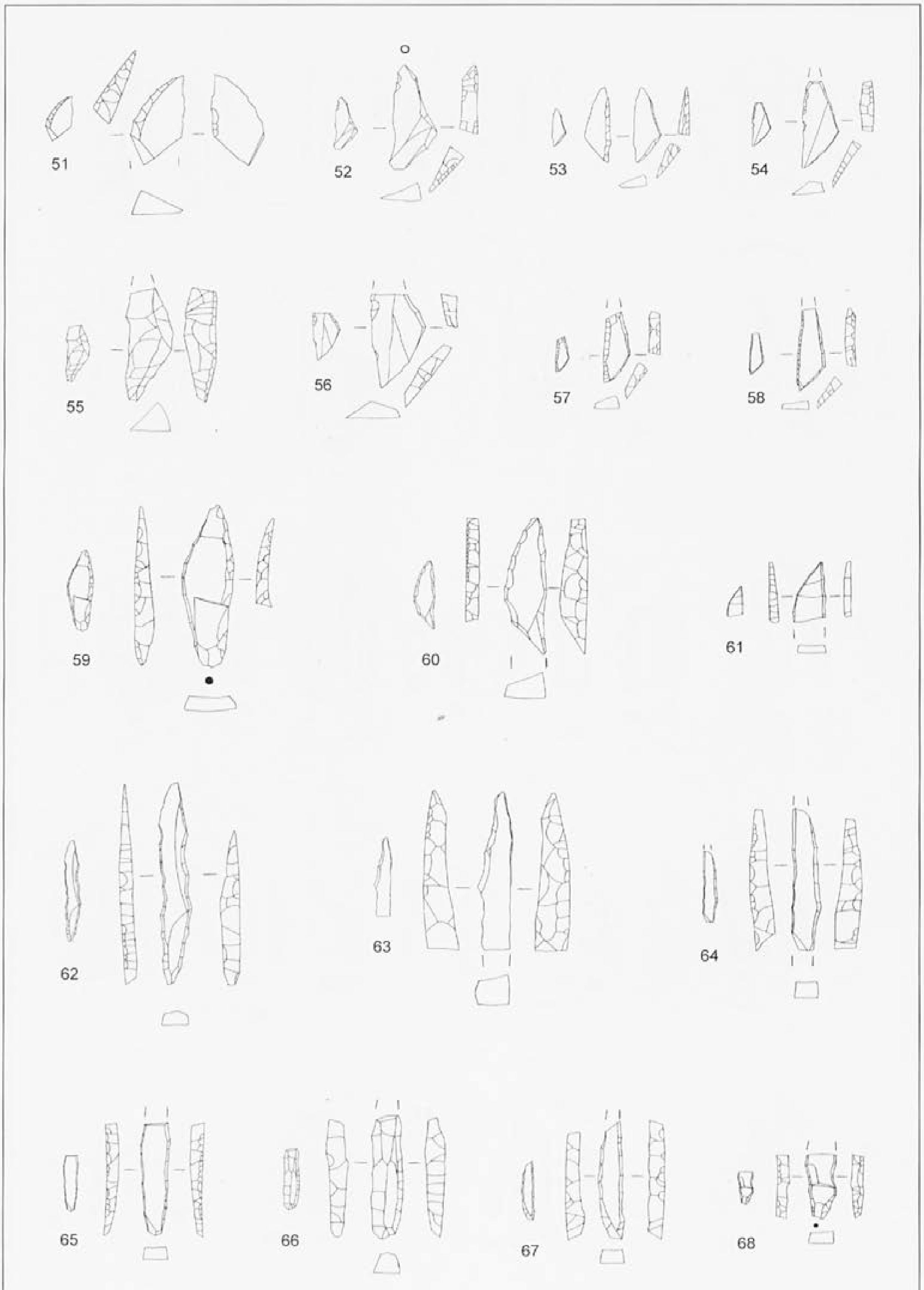
Pl. 1: Viktorjev spodmol, cores, Viktor and Viktor+IzA phases. All 1:1, no. 7 also 2:1. Drawings I. Turk. (Explanation of tables: The numbers in the tables are the inventory numbers of the items.)



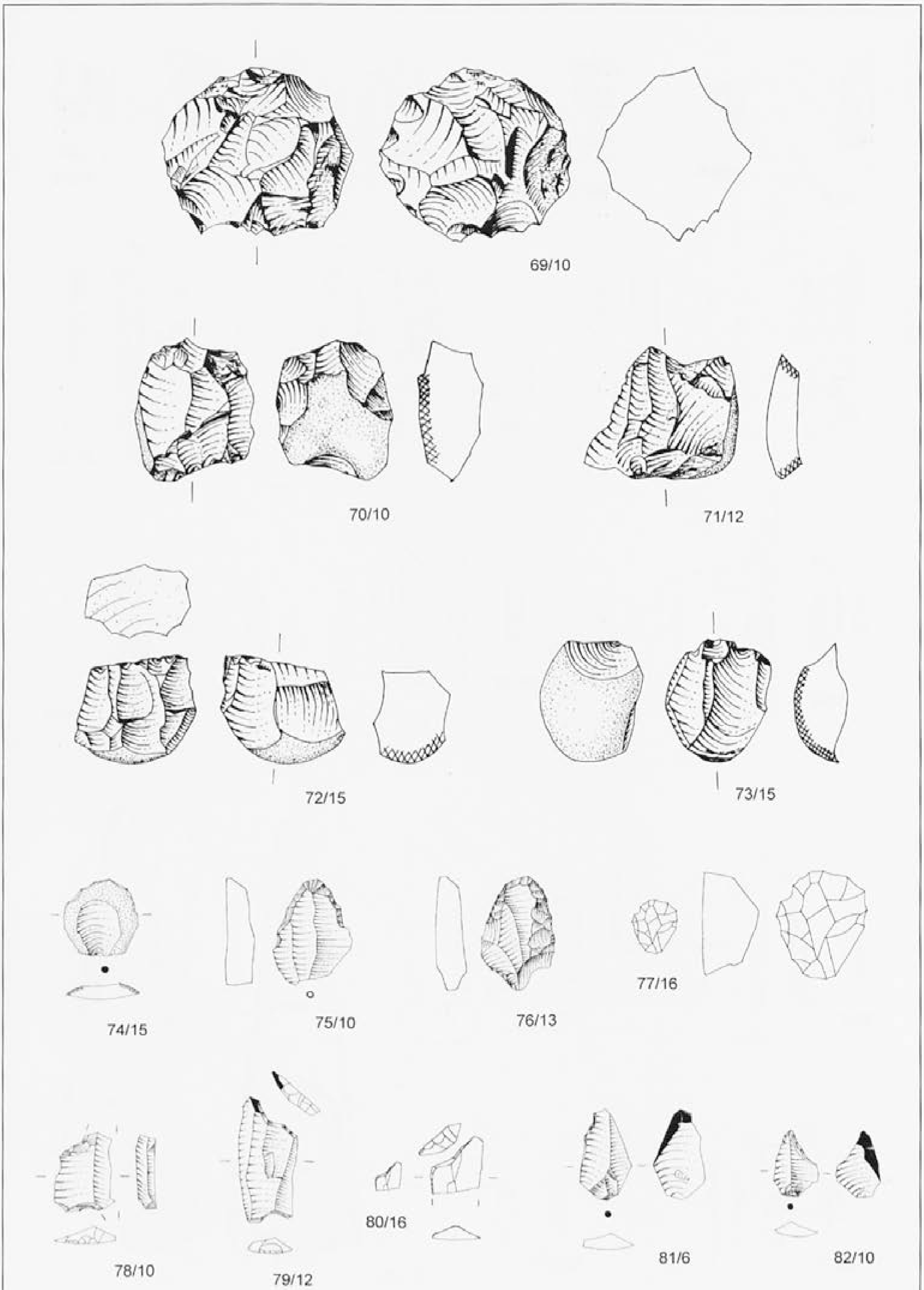
T. 2: Viktorjev spodmol, razno, fazi Viktor in Viktor+IzA. Vse 1:1, št. 22, 25–31 tudi 2:1. Risbe I. Turk in M. Turk.
Pl. 2: Viktorjev spodmol, various, Viktor and Viktor+IzA phases. All 1:1, no. 22, 25–31 also 2:1. Drawings I. Turk and M. Turk.



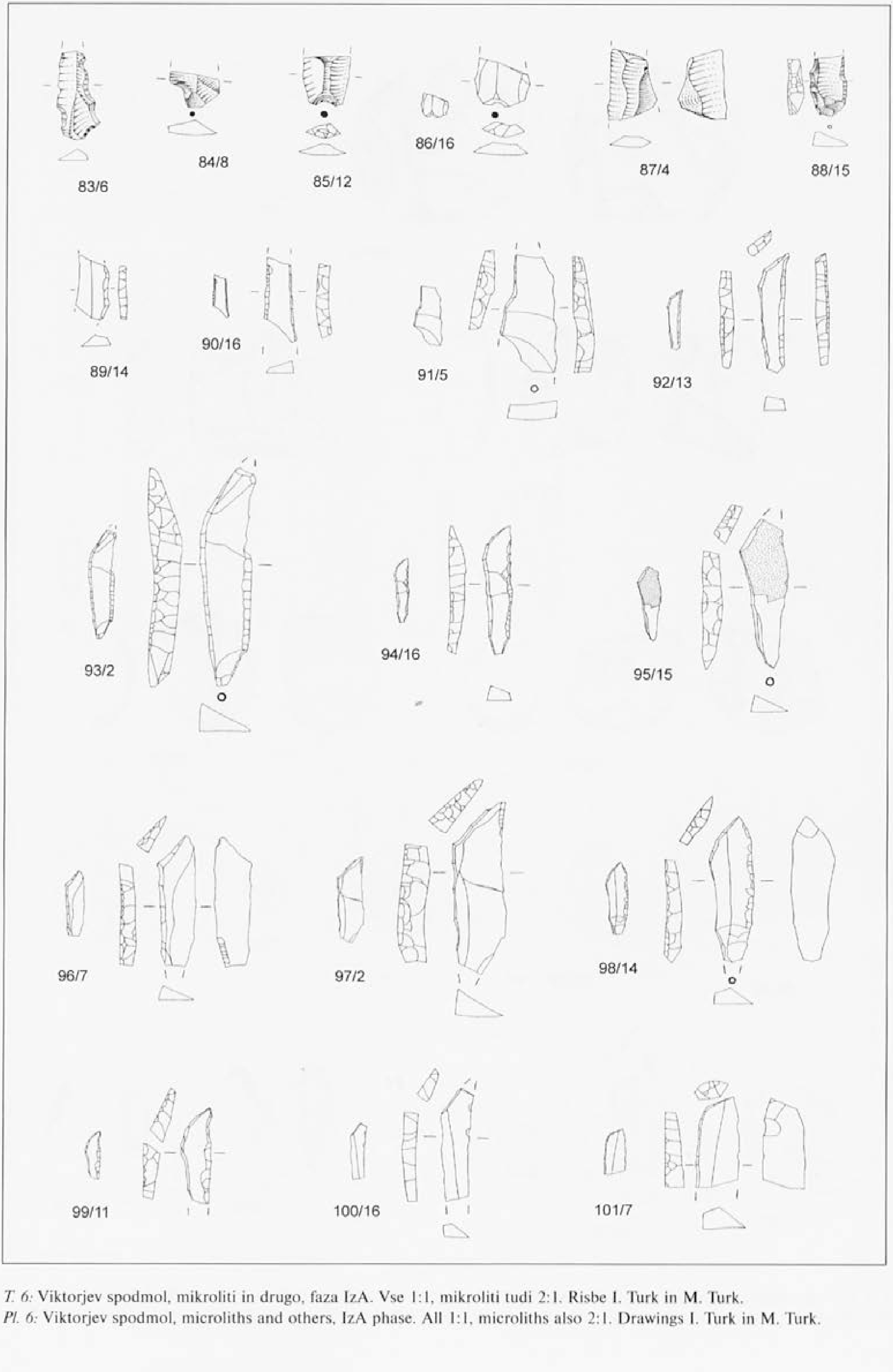
T. 3: Viktorjev spodmol, mikroliti, fazi Viktor in Viktor+IzA. Vse 1:1 in 2:1. Risbe M. Turk.
Pl. 3: Viktorjev spodmol, microliths, Viktor and Viktor+IzA phases. All 1:1 in 2:1. Drawings M. Turk.



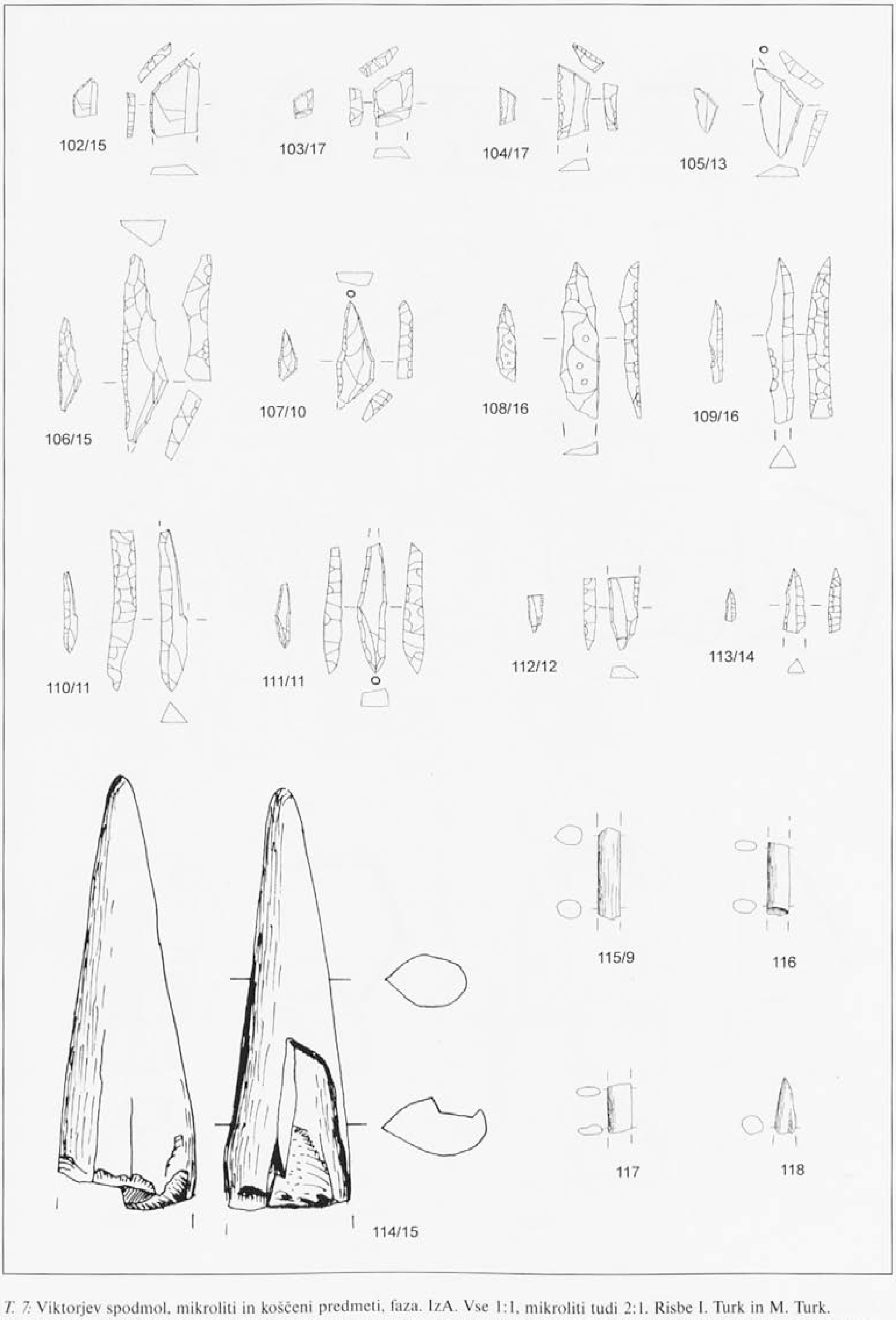
T. 4: Viktorjev spodmol, mikroliti, fazi Viktor in Viktor+IzA. Vse 1:1 in 2:1. Risbe M. Turk.
Pl. 4: Viktorjev spodmol, microliths, Viktor and Viktor+IzA phases. All 1:1 in 2:1. Drawings M. Turk.



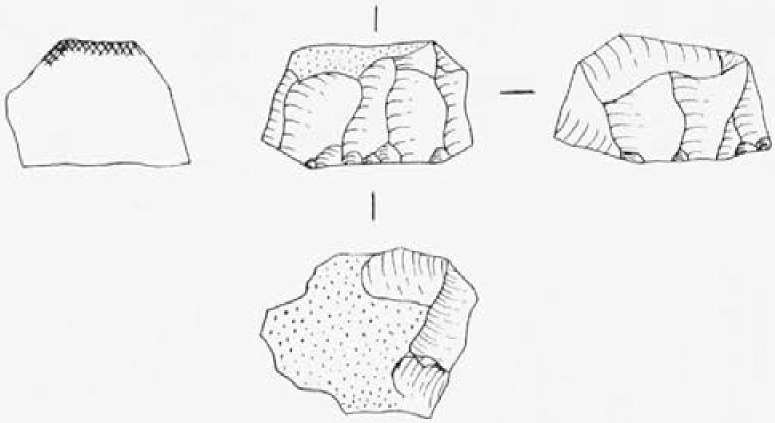
T. 5: Viktorjev spodmo, jedra in drugo, faza IzA. Vse 1:1, št. 77/16 in 80/16 tudi 2:1. Risbe I. Turk in M. Turk.
Pl. 5: Viktorjev spodmo, cores and others, IzA phase. All 1:1, no. 77/16 in 80/16 also 2:1. Drawings I. Turk in M. Turk.



T. 6: Viktorjev spodmol, mikroliti in drugo, faza IzA. Vse 1:1, mikroliti tudi 2:1. Risbe I. Turk in M. Turk.
Pl. 6: Viktorjev spodmol, microliths and others, IzA phase. All 1:1, microliths also 2:1. Drawings I. Turk in M. Turk.



T. 7: Viktorjev spodmol, mikroliti in koščeni predmeti, faza. IzA. Vse 1:1, mikroliti tudi 2:1. Risbe I. Turk in M. Turk.
Pl. 7: Viktorjev spodmol, microliths and bone items, IzA phase. All 1:1, microliths also 2:1. Drawings I. Turk and M. Turk.



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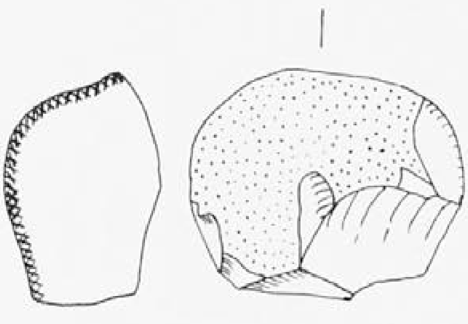

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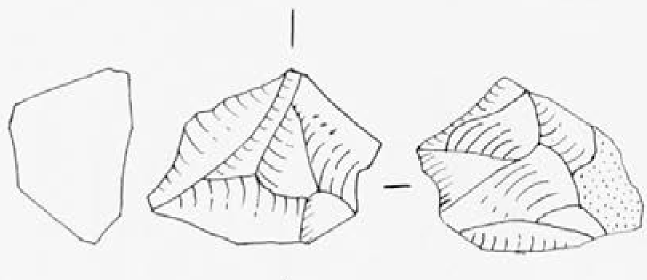

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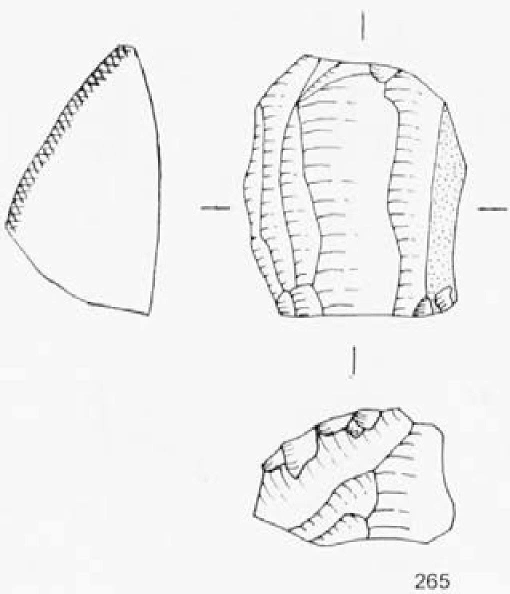

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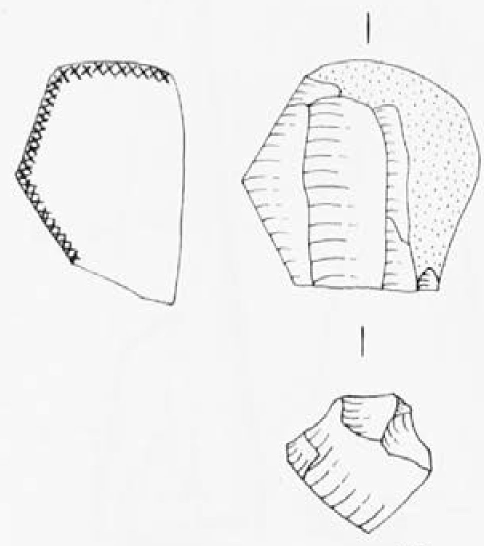

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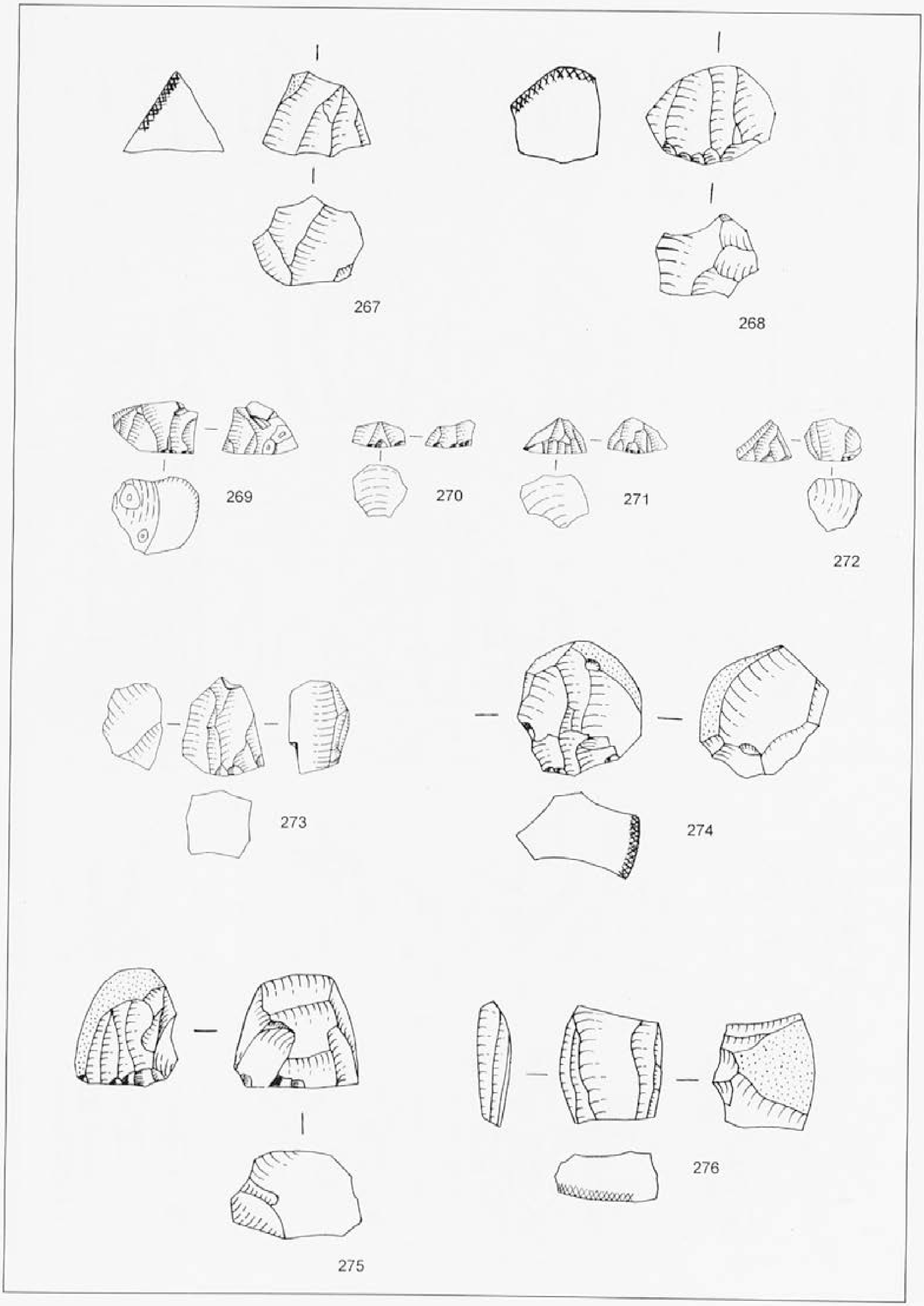
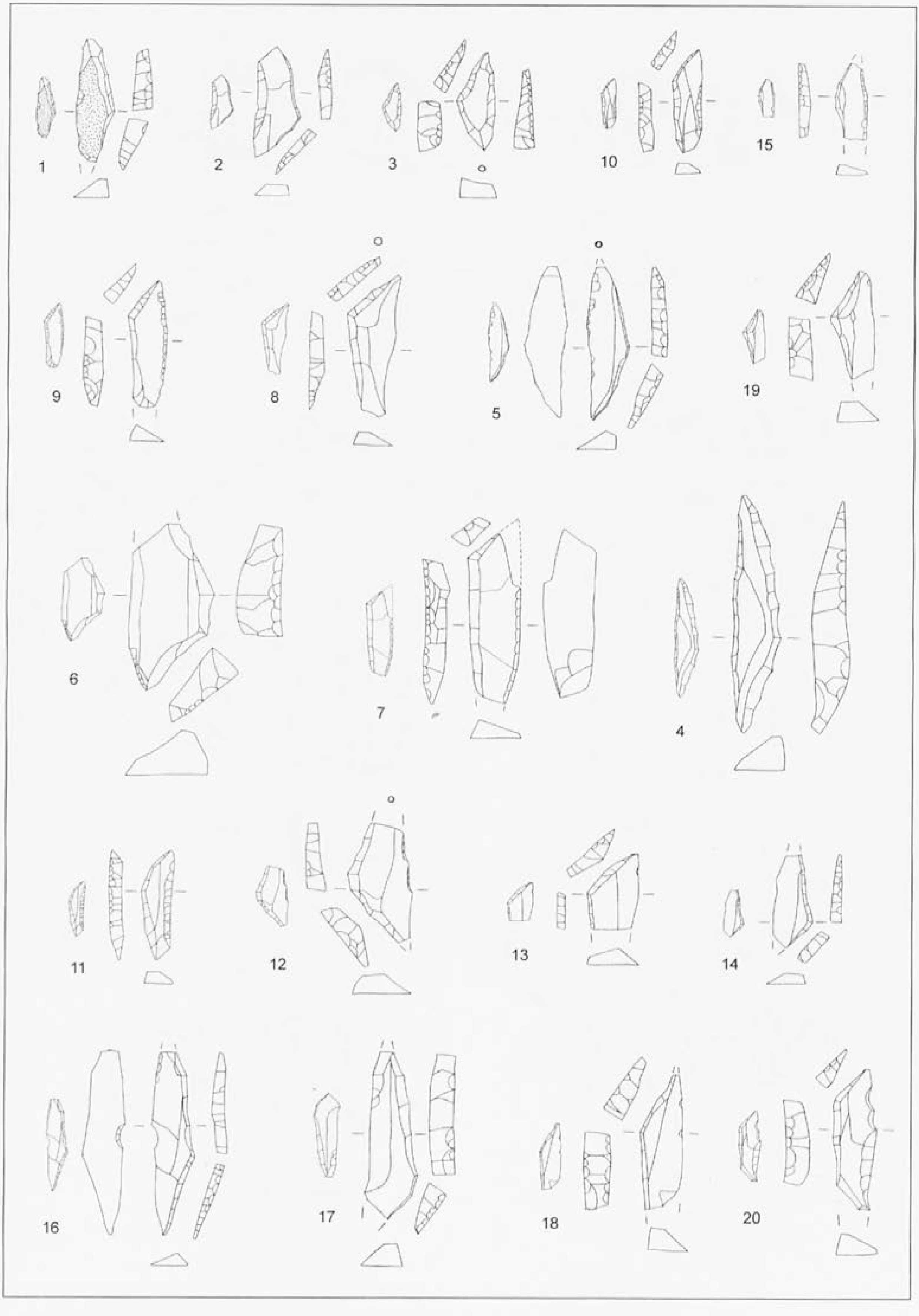
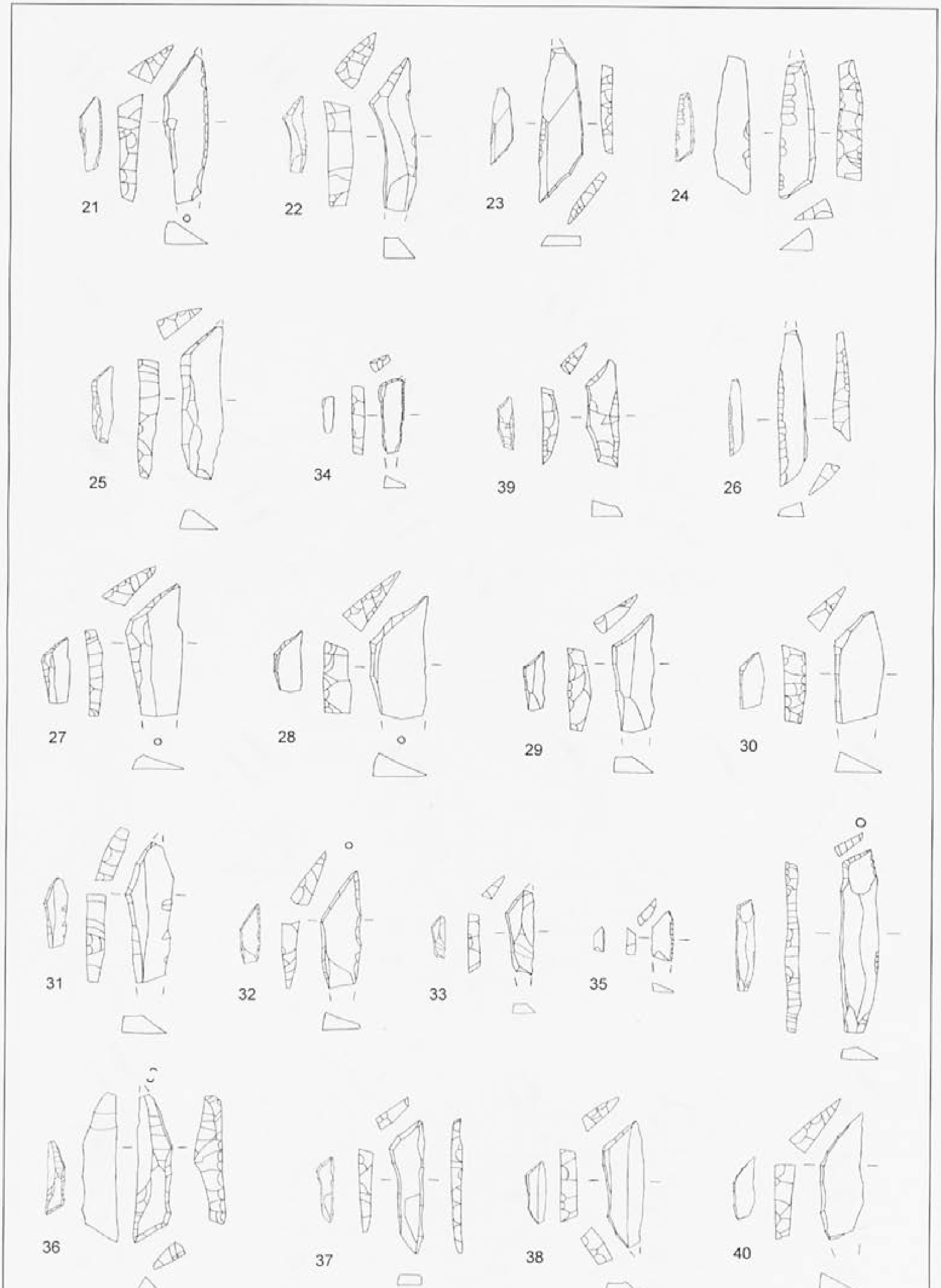
T. 8: Mala Triglavca, jedra, izkopavanje F. Lebna. Vse 1:1. Risbe M. Turk.
Pl. 8: Mala Triglavca, cores, F. Leben's excavations. All 1:1. Drawings M. Turk.



T. 9: Mala Triglavca, jedra, izkopavanje F. Lebna. Vse 1:1. Risbe M. Turk.
Pl. 9: Mala Triglavca, cores, F. Leben's excavations. All 1:1. Drawings M. Turk.

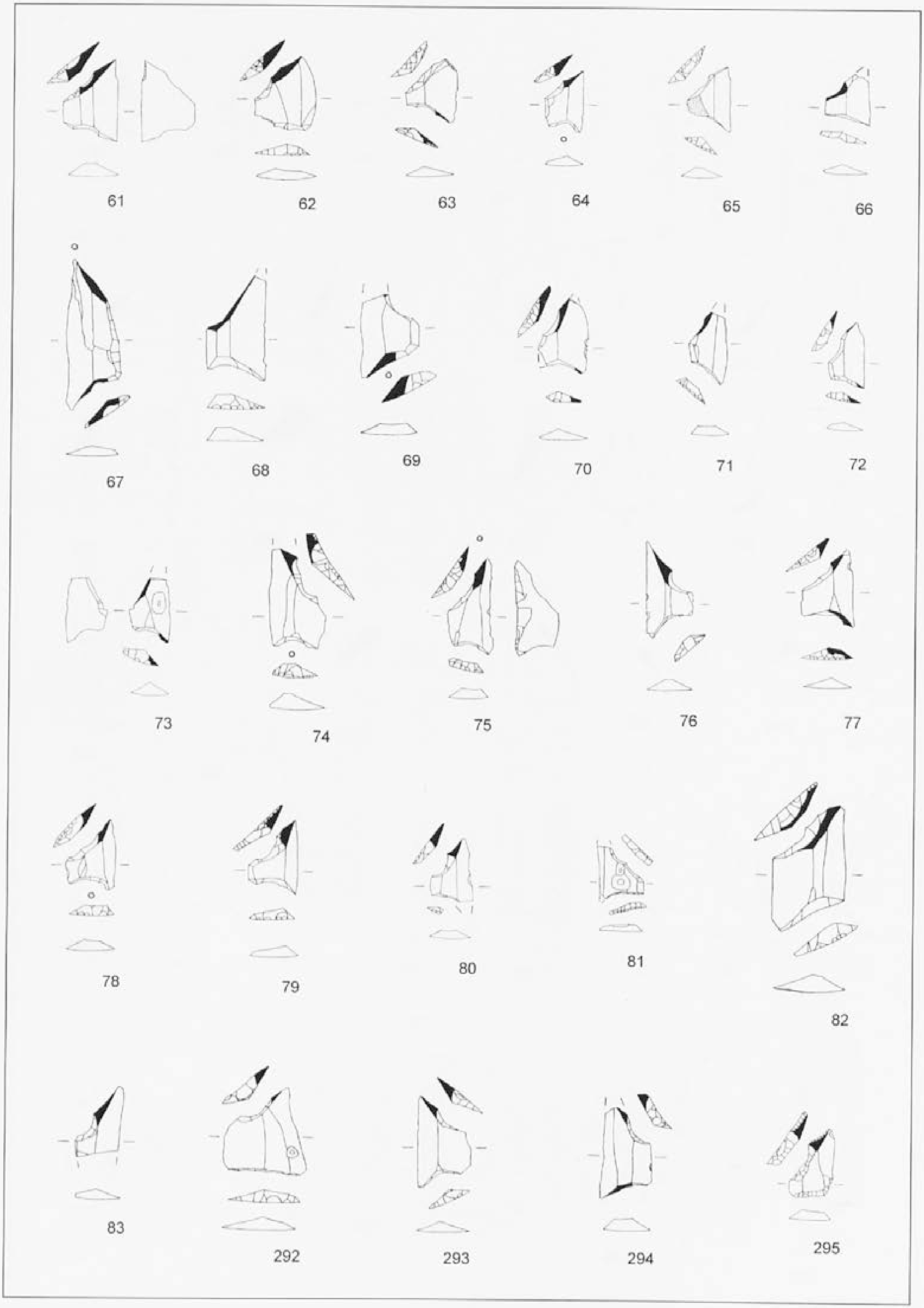


T. 10: Mala Triglavca, mikroliti, izkopavanje F. Lebna. Vse 1:1 in 2:1. Risbe M. Turk.
Pl. 10: Mala Triglavca, microliths, F. Leben's excavations. All 1:1 and 2:1. Drawings M. Turk.

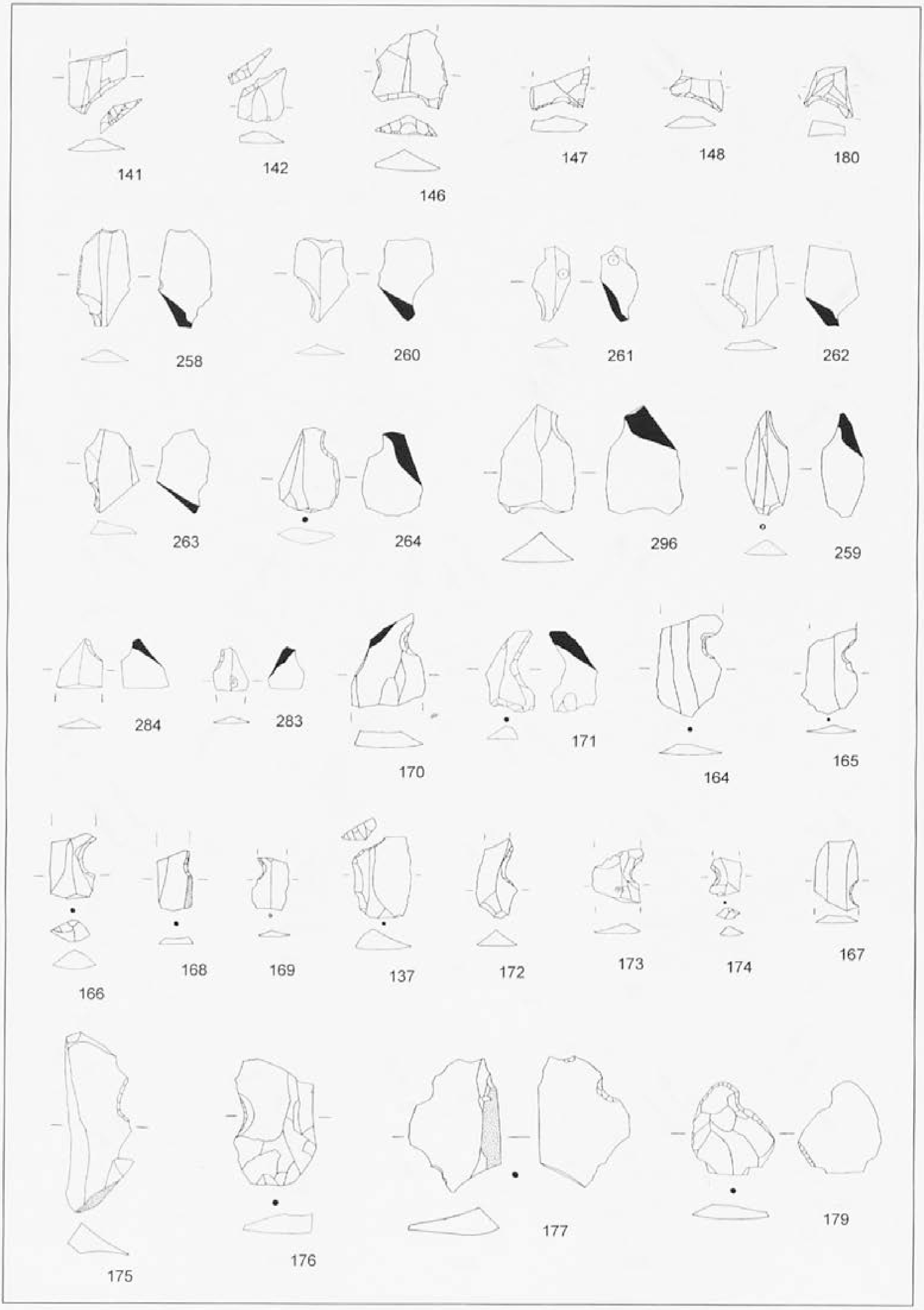


T. 11: Mala Triglavca, mikroliti, izkopavanje F. Lebna. Vse 1:1 in 2:1. Risbe M. Turk.
Pl. 11: Mala Triglavca, microliths, F. Leben's excavations. All 1:1 and 2:1. Drawings M. Turk.

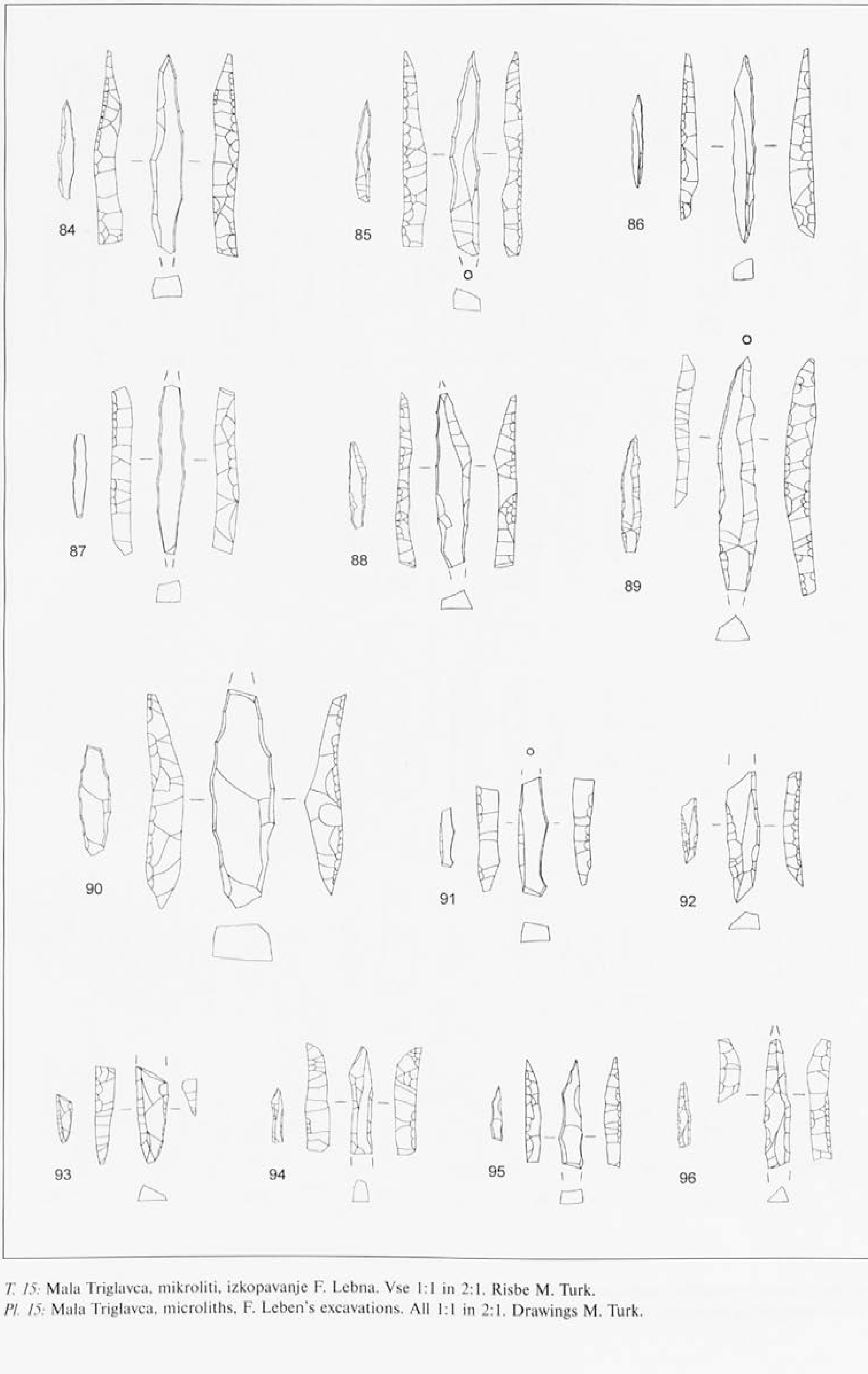
T. 12: Mala Triglavca, mikroliti, izkopavanje F. Lebna. Vse 1:1, št. 41–44 in 291 tudi 2:1. Risbe M. Turk.
Pl. 12: Mala Triglavca, microliths, F. Leben's excavations. All 1:1, no. 41–44 and 291 also 2:1. Drawings M. Turk.



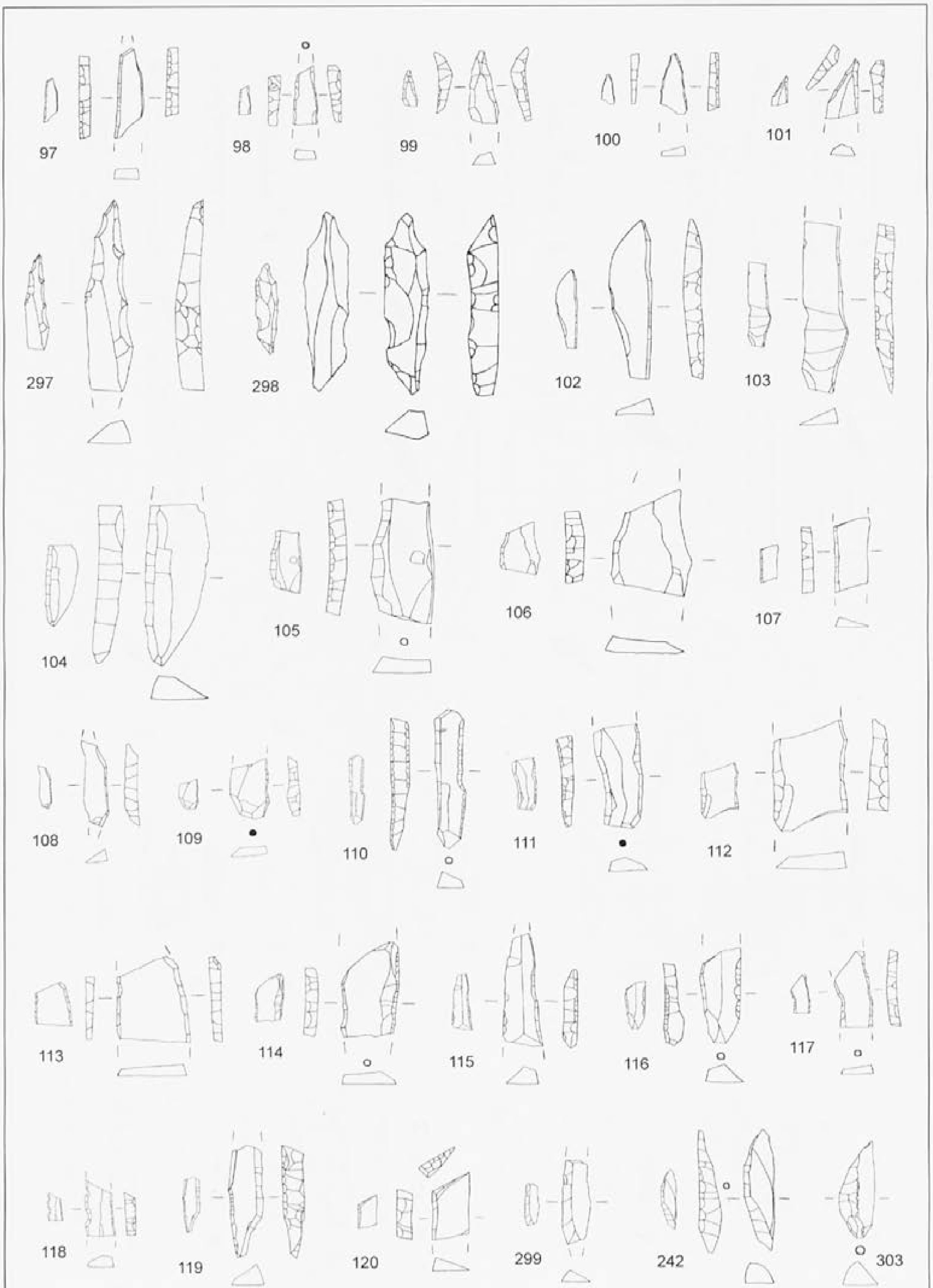
T. 13: Mala Triglavca, mikroliti, izkopavanje F. Lebna. Vse 1:1. Risbe M. Turk.
Pl. 13: Mala Triglavca, microliths, F. Leben's excavations. All 1:1. Drawings M. Turk.



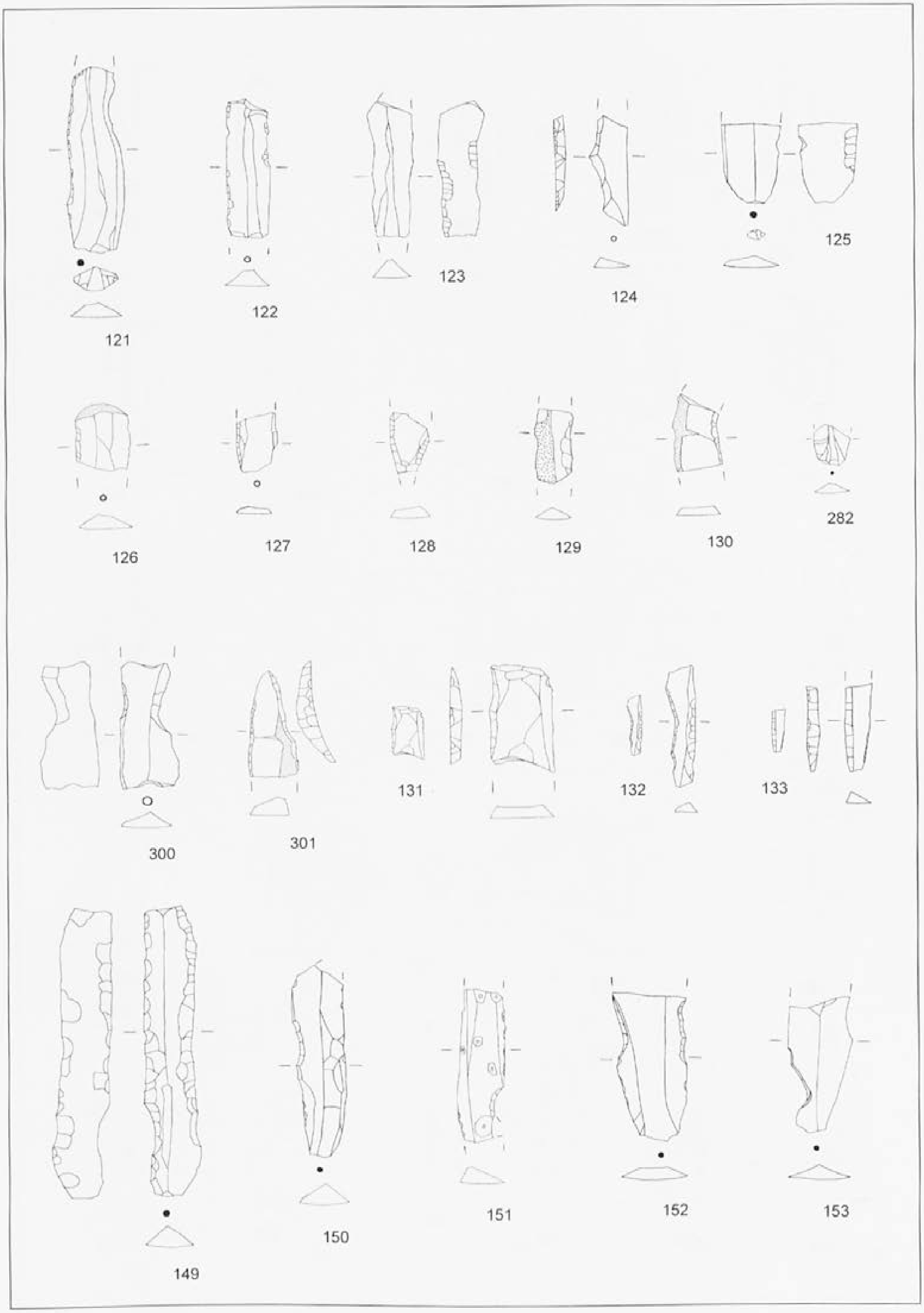
T. 14: Mala Triglavca, razno, izkopavanje F. Lebna. Vse 1:1. Risbe M. Turk.
Pl. 14: Mala Triglavca, various, F. Leben's excavations. All 1:1. Drawings M. Turk.



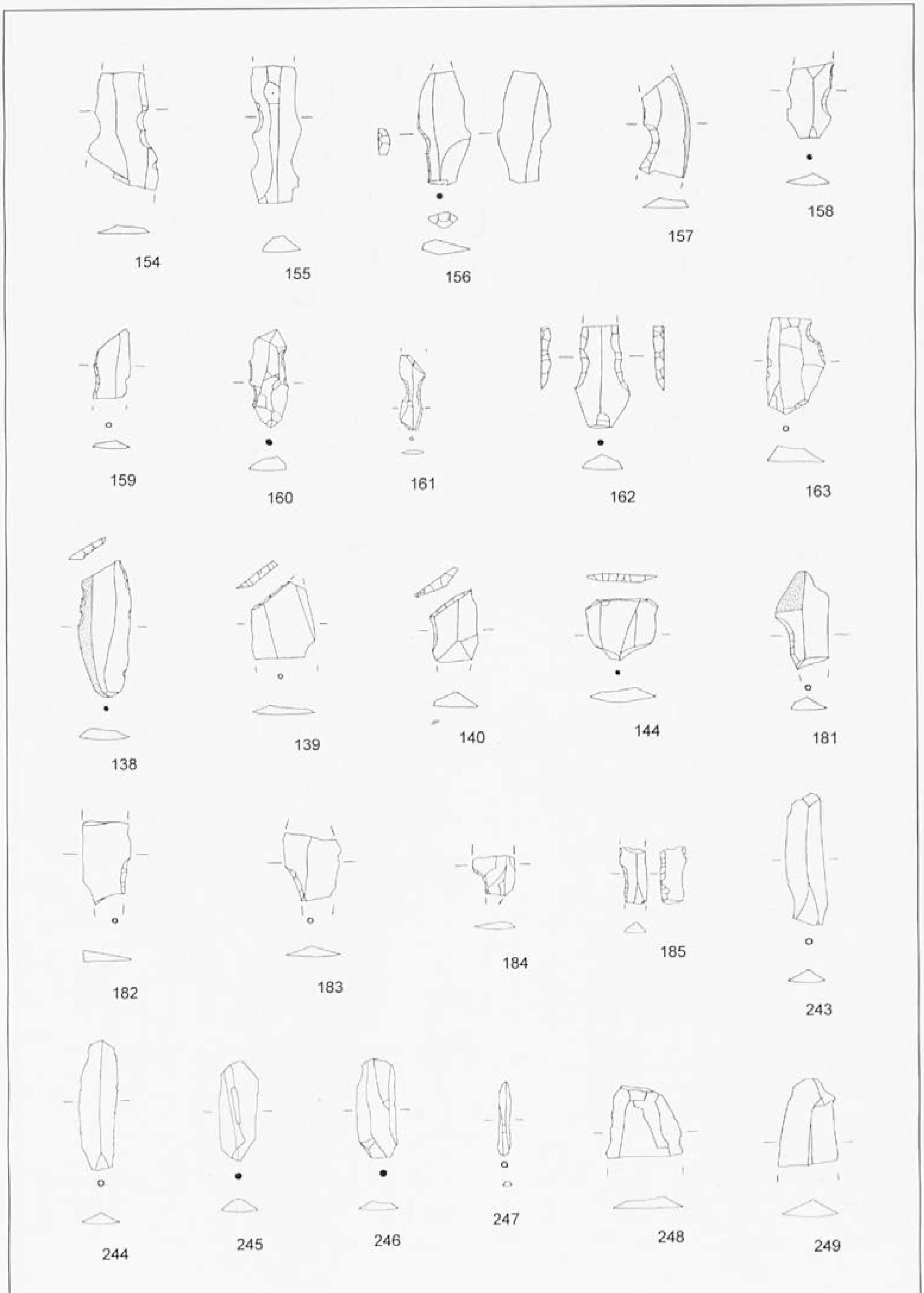
T. 15: Mala Triglavca, mikroliti, izkopavanje F. Lebna. Vse 1:1 in 2:1. Risbe M. Turk.
Pl. 15: Mala Triglavca, microliths, F. Leben's excavations. All 1:1 in 2:1. Drawings M. Turk.



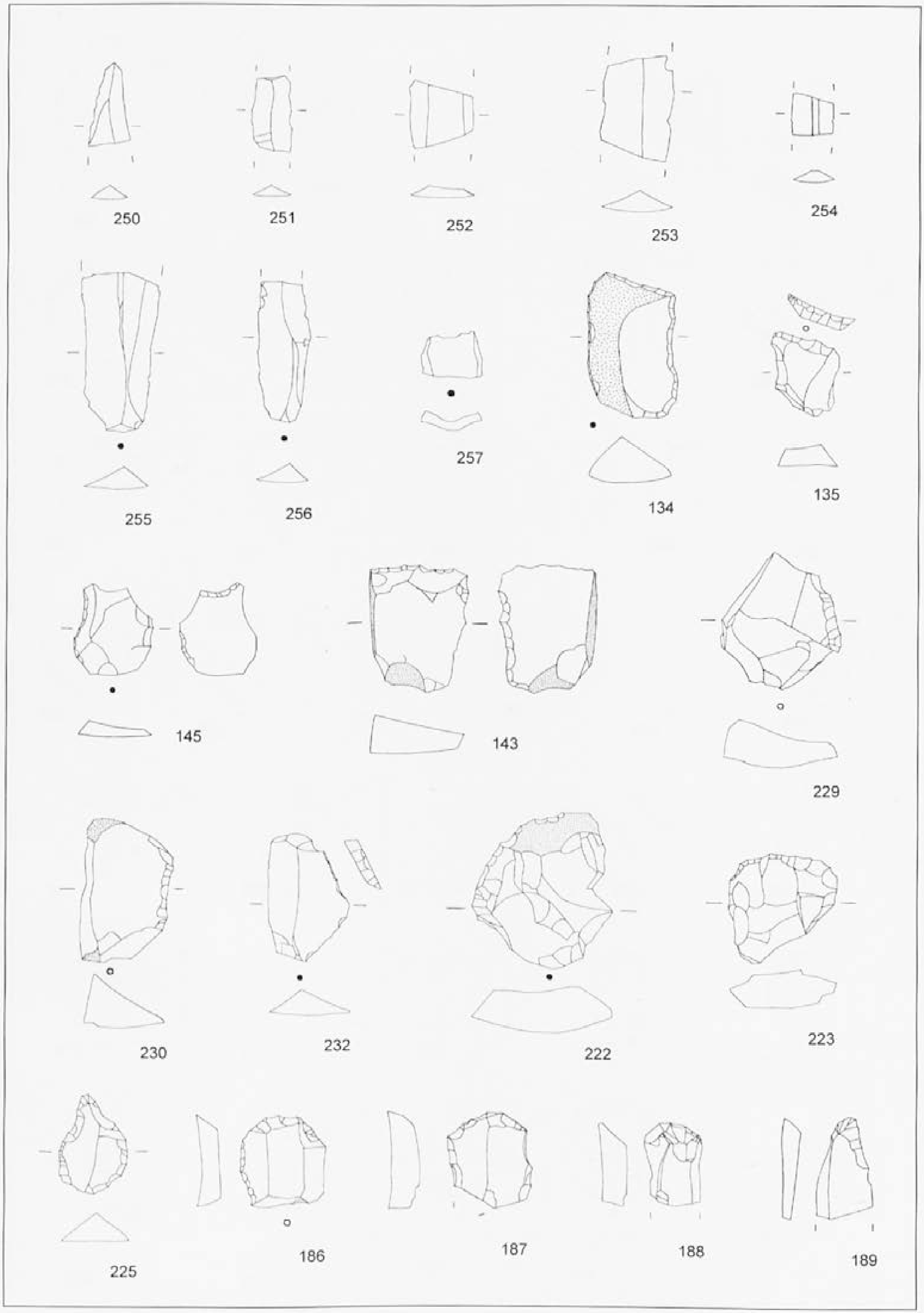
T. 16: Mala Triglavca, mikroliti, izkopavanje F. Lebna. Vse 1:1 in 2:1. Risbe M. Turk.
Pl. 16: Mala Triglavca, microliths, F. Leben's excavations. All 1:1 in 2:1. Drawings M. Turk.



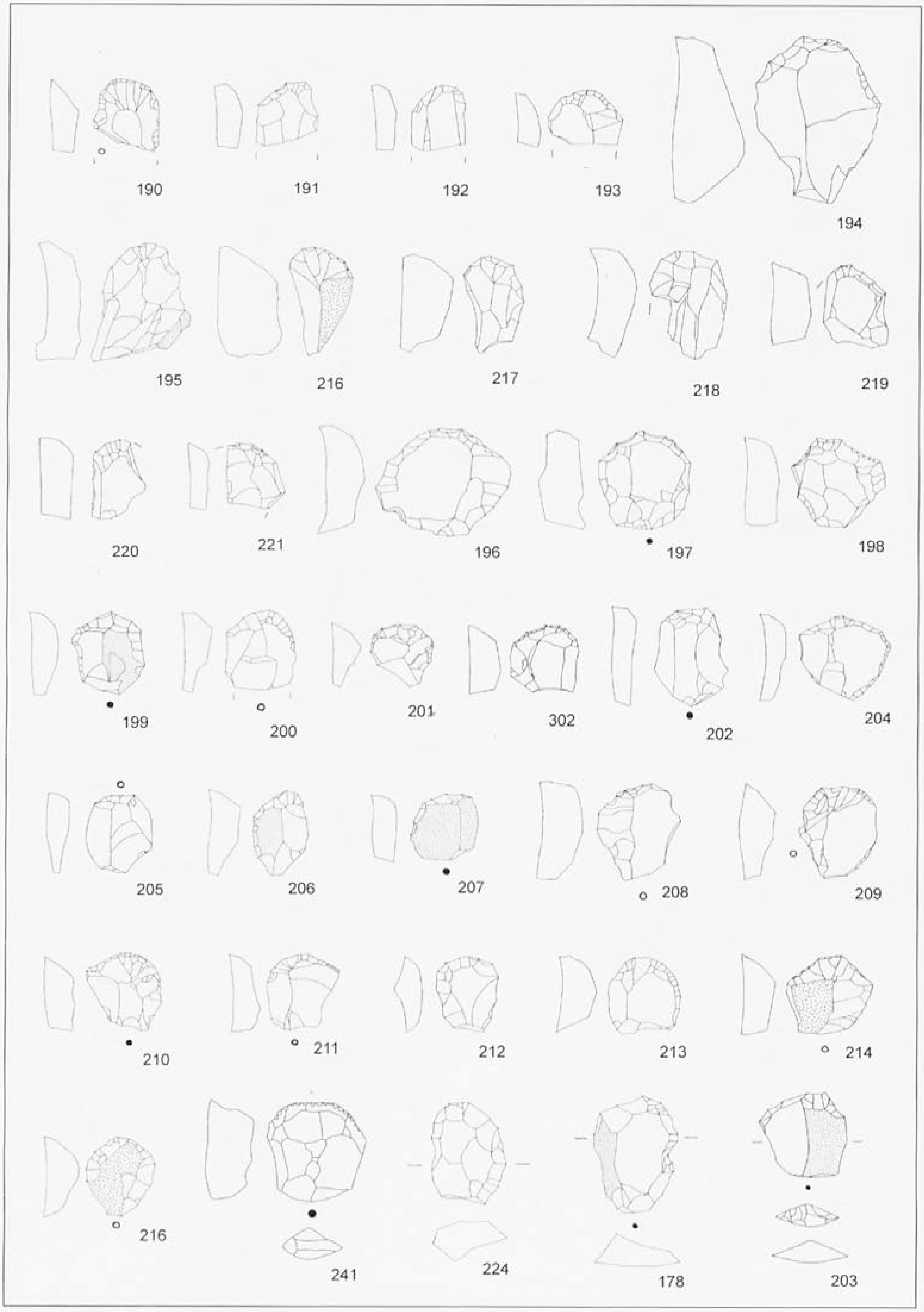
T. 17: Mala Triglavca, kline in klinice, izkopavanje F. Lebna. Vse 1:1, št. 131–133 tudi 2:1. Risbe M. Turk.
Pl. 17: Mala Triglavca, blades and bladelets, F. Leben's excavations. All 1:1, no. 131–133 also 2:1. Drawings M. Turk.



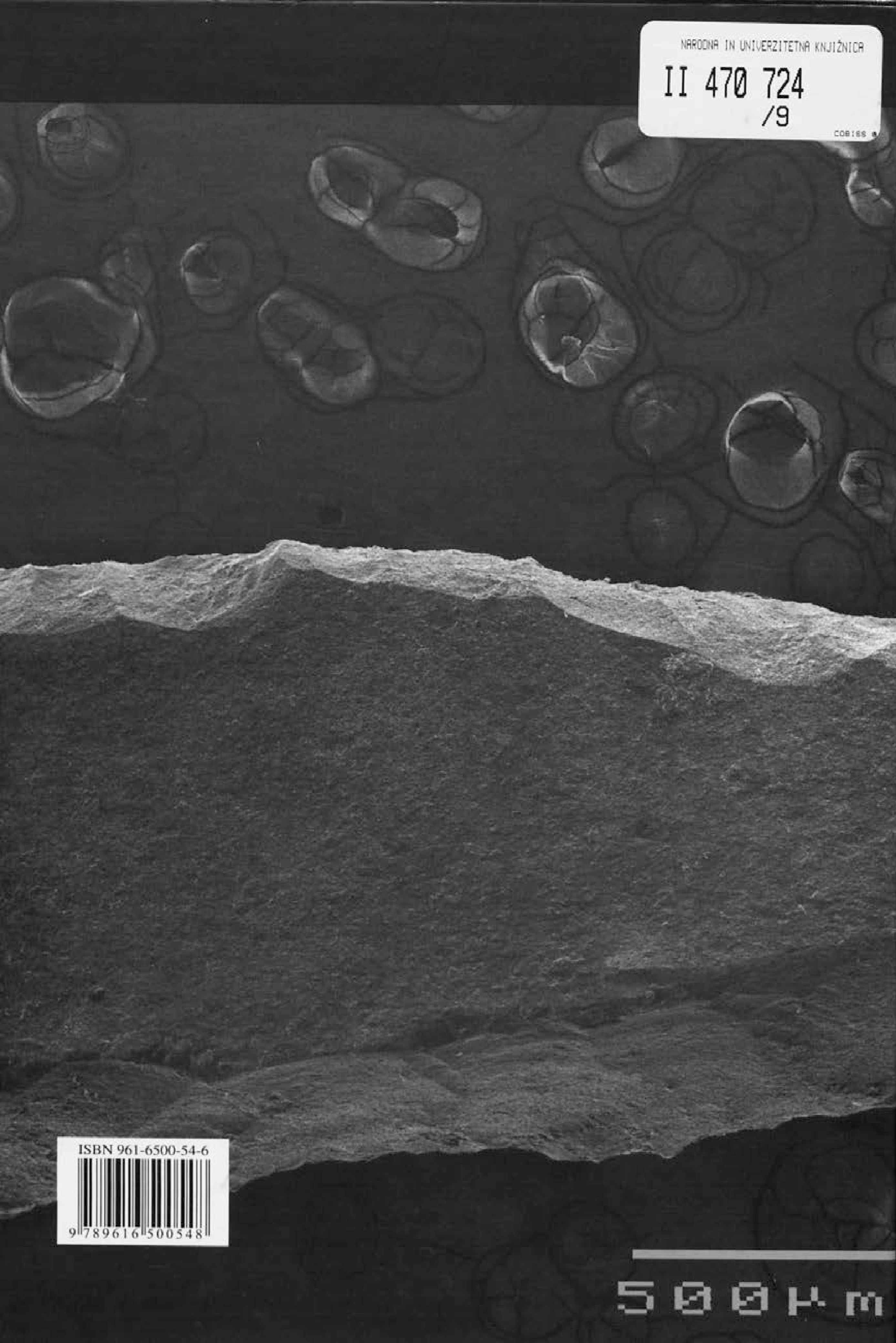
T. 18: Mala Triglavca, razno, izkopavanje F. Lebna. Vse 1:1. Risbe M. Turk.
Pl. 18: Mala Triglavca, various, F. Leben's excavations. All 1:1. Drawings M. Turk.



T. 19: Mala Triglavca, razno, izkopavanje F. Lebna. Vse 1:1. Risbe M. Turk.
Pl. 19: Mala Triglavca, various, F. Leben's excavations. All 1:1. Drawings M. Turk.



T. 20: Mala Triglavca, praskala, izkopavanje F. Lebna. Vse 1:1. Risbe M. Turk.
Pl. 20: Mala Triglavca, endscrapers, F. Leben's excavations. All 1:1. Drawings M. Turk.



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