Neolitizacija Krasa

Tomaž FABEC

Izvleček

Avtor predstavlja svoj pogled na vprašanje neolitizacije Krasa. Izhaja iz analize družbenozgodovinskih kontekstov, v katerih so se razlage neolitizacije regije oblikovale, ter preko kritične analize objavljenih podatkov in uporabe koncepta "stratigrafske kontekstualnosti" poskuša izločiti novo podatkovno bazo, na podlagi katere ponudi novo sliko procesa prehoda zgodnjeholocenskih lovsko-nabiralniških skupnosti v skupnosti, ki so bile odvisne od biološko udomačenih virov.

Abstract

The author presents his view of the question of the neolithisation of the Karst. It derives from analysis of the socio-historical contexts in which explanations of the neolithisation of the region were created, and through critical analysis of published data and use of the concept of "stratigraphic contextuality" he tries to extract a new database, on the basis of which he also provides a new picture of the process of transition of the early Holocene hunter-gatherer communities which were dependent on biologically domesticated sources.

UVOD

V zadnjem dvajsetletju postaja vse očitneje, da je del arheoloških podatkov o neolitizaciji Krasa bolj ali manj nezanesljiv, ker je njihov izvor nezanesljiv in torej problematičen. Te ugotovitve žal niso vodile h kritični in selektivni uporabi podatkov in niso bile konstruktivno vključene v sicer živahne razprave o prehodu iz mezolitika v neolitik na Krasu. Zato je bil prvotni namen tega prispevka preveriti ter oceniti zanesljivost in uporabnost tistih objavljenih arheoloških podatkov, ki so za razumevanje neolitizacijskih procesov na Krasu lahko relevantni, ter preko njihove selektivne uporabe ponuditi še en "pogled".

Strukturo arheoloških podatkov in njihovo interpretacijo določajo tudi sodobne družbene potrebe in sodobni družbeni konteksti (Hodder 1986). Ta odnos je v sliki starejše prazgodovine Krasa, vsaj na nekaterih področjih, lepo viden in sem ga poskušal tudi nakazati. S tem sem hotel opozoriti na učinke "družbenega tafonomskega agensa", morda najvplivnejšega med "tafonomskimi" agensi, ki so sooblikovali tako sliko daljne preteklosti Krasa, kakršno poznamo danes.

Osnovna vprašanja, na katera v prispevku poskušam odgovoriti, so: kako se je oblikovala arheološka slika mezolitika in neolitika na Krasu? Kakšna je interpretativna vrednost arheoloških podatkov, ki to sliko gradijo? Ali lahko spoznavamo procese, ki so vodili k prehodu v pridelovalno gospodarstvo? Če lahko, na osnovi katerih podatkov? Kakšni so bili subsistenčni sistemi mezolitskih in prvih neolitskih skupin? Kje nastopajo spremembe in kateri so lahko vzroki zanje? Odgovore iščem v zgodovinskem razvoju prazgodovinske arheologije na Krasu. Z uporabo koncepta *stratigrafske kontekstualnosti* poskušam uporabiti tiste podatke, ki se mi zdijo verodostojni, torej predvsem tiste, ki jih določajo stratigrafski konteksti. Svoj pogled na neolitizacijo Krasa gradim predvsem z uporabo arheozooloških podatkov, v nekoliko manjši meri pa tudi z uporabo podatkov sedimentoloških in paleovegetacijskih raziskav ter analiz materialne kulture.

Območje, ki me zanima, je Kras. Kras je dokaj ostro zamejena regija, njene meje so mehke le na vzhodu. Na jugu ga omejuje Tržaški zaliv, na severu Vipavska dolina, na zahodu furlanska ravnina, na vzhodu pa Brkinsko gričevje. Od skupne površine okoli 500 km^2 se največji del regije razprostira v

Sloveniji, le obmorski in skrajni zahodni del Krasa pa pripadata Italiji. Kras ima obliko planote, nagnjene proti severozahodu, ki se s povprečne višine okoli 550 m okrog Divače zniža na okoli 80 m na robu Furlanske nižine.

Geološko podlago Krasa tvorijo kredni in terciarni apnenci in dolomiti ter mestoma in zelo redko tudi fliš. Apnenec je lahko topen v vodi in je povrh tega še tektonsko prepokan. Zato deževnica hitro izgine v notranjost, če je ne zadržita vegetacija in humus. Tako na Krasu kljub sorazmerni namočenosti ni površinskih vodotokov, zelo redka pa je tudi stoječa voda. V strukturi prevladujejo podzemne jame in podzemni vodni tokovi, ki izvirajo ob kraškem robu.

Kras pokrivata jerovica in rjava pokarbonatna prst oziroma rendzina. Razen v žepih in vrtačah so tla preplitva in navadno neprimerna za kmetovanje. Danes prekriva regijo t. i. kraški gozd, še pred stoletjem pa je bil Kras zaradi intenzivne paše in izsekavanja kamnita golota (Poldini 1989; Culiberg 1994).

V prispevku sem se poskušal držati geografskih mej regije, čeprav sem jih obravnaval mehko in sem včasih prostor opazovanja razširil tudi na neposredno okolico regije.

Časovni interval, ki zaobjema dogajanje, o katerem pišem, zamejujem prav tako mehko. Dogajanje opazujem v terminih periodne razdelitve časa, ki je na tem prostoru zamejen z mezolitsko in neolitsko periodo. Razlog za tako zamejitev je predvsem v pomanjkanju trdnih absolutnih datumov. Na podlagi redkih dosedanjih radiokarbonskih datacij bi bilo vsekakor videti, da je mogoče mezolitsko periodo uokviriti v časovni interval od polovice 10. do polovice 7. tisočletja, neolitsko pa od polovice 7. do polovice 6. tisočletja uncal BP (Guerreschi 1999, 83-84; Montagnari Kokelj et al. 1996). Mejo med periodama obravnavam prav tako mehko.

V delu sem potek neolitizacije Krasa skušal razumeti predvsem na podlagi objavljenih arheoloških podatkov. Neolitizacijo razumevam in obravnavam kot prehod v pridelovalno gospodarstvo (prim. Zvelebil 1986), zaradi česar sem pozornost osredotočil na zapise o osnovnem gospodarstvu mezolitskih in neolitskih skupnosti. Opazoval sem predvsem favnistične in botanične zapise v najdiščih, nisem se pa loteval simbolnih in ideoloških aspektov neolitizacije. Ker me je zanimal predvsem gospodarski aspekt prehoda, se nisem veliko poglabljal v vprašanja tipologije ostankov, kljub temu da je ta tema v razpravah o neolitizaciji Krasa še najbolj prisotna in določa temelje konceptoma *mezolitik* in *neolitik*. Dogajanja na Krasu nisem primerjal z dogajanjem v okoliških regijah, kljub temu da sem pri oblikovanju lastnih pogledov upošteval dogajanje v okolici.

ODKRIVANJE MEZOLITIKA IN NEOLITIKA NA KRASU

Splošna, analitična zgodovina prazgodovinskih raziskav na Krasu še ni bila zapisana. Na voljo je le nekaj prispevkov, ki so večinoma vezani le na italijanski del Krasa (npr. Cannarella 1984a) in ki navadno obravnavajo le specifična področja te teme (npr. Cannarella 1984b; Leben 1959; Montagnari Kokelj 1993; Moretti 1980). Zaradi tega sem poskušal sliko dopolniti z lastnimi opažanji in predvsem z informacijami, ki mi jih je prijazno posredoval izkušen poznavalec zgodovine tržaškega jamarstva g. Pino Guidi.

Potek in intenzivnost arheoloških raziskav na Krasu nista kontinuirana ne v časovni niti v prostorski dimenziji. V skladu s političnimi in družbenimi interesi (cf. Bitelli 1999) je bilo zanimanje za prazgodovino te regije v različnih obdobjih različno, razvoj političnih razmejitev prostora pa je močno vplival na njeno dostopnost in dojemanje.

Začetki prazgodovinskih raziskav na Krasu segajo v drugo polovico 19. stoletja, v čas, ko je Kras pripadal avstroogrski monarhiji. Intelektualno jedro primorskega dela monarhije, ki je bilo vezano na vedno močnejšo buržoazijo, je bilo cvetoče mesto Trst (Trieste), v veliko manjši meri tudi Gorica (Gorizia) in Koper. V teh centrih so že pred tem, v času humanizma in renesanse, nastajale prve velike privatne zbirke, ki so poleg umetnin hranile tudi serijo paleontoloških in arheoloških najdb, t. i. curiosa. Po smernicah te tradicije so se, vzporedno z nastajanjem javnih muzejev, oblikovali krogi intelektualcev, ki so presegali antikvarsko dojemanje teh *arteficialij* in *naturalij*. *Curiosa* so začeli zbirati tudi zato, da bi lahko spregovorili o daljni preteklosti.

Glavna protagonista tega obdobja, ki ga zaradi drastičnih družbeno-političnih sprememb v dvajsetih letih prejšnjega stoletja lahko zamejimo s koncem prve svetovne vojne, sta bila zdravnik C. Marchesetti, direktor Naravoslovnega muzeja v Trstu, ter učitelj K. Moser, ki so ga podpirale znanstvene ustanove na Dunaju. Njun opus ne govori le o tedanjem intenzivnem raziskovanju Krasa, temveč odseva dva pola takratnega vročega političnega vzdušja.[1]

[1] Tu mislim npr. na utrjevanje iredentističnih idej. Antagonizem med Marchesettijem in Moserjem se vsekakor zrcali tudi v strokovnih objavah (npr. Marchesetti 1890).

Kakorkoli že, oba sta izkopavala na številnih najdiščih in odkrivala sledi prazgodovinskih skupnosti. Predvsem K. Moser je svoje zanimanje usmeril v arheološke zapise iz jam ter dognanja strnil v monografiji *Der Karst und seine Höhlen* (1899). Z razliko od C. Marchesettija, ki je izkopaval na številnih lokacijah v Istri, na Krasu in v Posočju, je K. Moser jame intenzivno raziskoval pretežno na Krasu in predvsem v širši okolici Nabrežine (Aurisina). Tudi C. Marchesetti je veliko izkopaval v jamah, še več truda pa je vložil v raziskovanje gradišč in v izkopavanje grobišč v Škocjanu in Mostu na Soči. Oba sta rezultate raziskav navadno objavljala, čeprav pogosto v obliki preliminarnih in torej zelo skopih člankov. Neredko poročata o neolitskih najdbah. Take opredelitve izkopanin so se v številnih primerih izkazale kot pravilne, saj so jih poznejše tudi revizijske raziskave vsaj deloma potrdile,[2] čeprav so se vsebina in značilnosti pojma "neolitik" takrat nekoliko razlikovale od današnjih.

V fašističnem *"Ventenniu"* so se arheološke raziskave zaradi politične volje in vzdušja osredotočile na odkrivanje rimskih ostankov (Bandelli 1991; Bitelli 1999). Izjema je bilo delo arheologa R. Battaglie, docenta na Univerzi v Padovi, ki je nadaljeval z raziskovanjem prazgodovine Krasa in drugih regij tudi v tem obdobju. Battaglia je večino odkritih prazgodovinskih ostankov prisodil neolitiku, saj je domneval, da so bile jame poseljene predvsem v tistem obdobju (cf. Battaglia 1927). Izkazalo se je, da je dobršen del teh najdb mlajši (Leben 1959; 1967).

Ob koncu druge svetovne vojne je nova meja med Conama A in B, ki je leta 1954 postala jugoslovansko-italijanska državna meja, razbila Kras na dvoje. Zaledje Trsta se je v vseh vidikih bistveno skrčilo, raziskovalni prostor "tržačanov" se je zožil na ozek pas kraške planote med Socerbom, Bazovico (Basovizza) in Devinom (Duino). Zahodni del Krasa, ki je bil že leta 1947 dodeljen Italiji in administrativno priključen pokrajini Gorica (*Provincia di Gorizia*), je postal del zaledja Gorice in rastočega Tržiča (Monfalcone), ki pa sta bila v primerjavi s Trstom praktično skoraj brez institucij, ki bi lahko pričele z arheološkim raziskovanjem. Do podobne situacije je prišlo tudi na jugoslovanskem delu Krasa, kjer so arheološke raziskave potekale v senci primarnega političnega in družbenega interesa, t. i. gradnje nove države.

V povojnem času se je torej arheologija "dogajala" predvsem na ozemlju, ki ga je označeval nov pojem - *Tržaški kras* (Carso Tristino). Tu so se skoncentrirale tudi intenzivne speleološke raziskave, ki so v največji meri prispevale k odkrivanju predkaštelirske prazgodovine. Jamarji so med raziskovanjem podzemlja pogosto odkrivali arheološke ostanke, tako da so se med njimi kmalu oblikovale skupine ljubiteljev arheologije. Tem skupinam ali posameznikom je tržaška *Soprintendenza*[3] pogosto dovoljevala izkopavati v jamah, tako da so bili prav amaterji[4] tisti, ki so največkrat posegali v arheološke depozite. Med te nedvomno sodita zelo aktivna člana društva *Società alpina delle Giulie* F. Stradi in F. Legnani ter član društva *Gruppo ricerche di paleontologia umana dell'Associazione XXX Ottobre (Club Alpino Italiano)* G. Marzolini. Veliko je v jamah izkopaval finančni stražnik D. Cannarella, ki se je pozneje kot sodelavec zaposlil na Soprintendenzi. Na drugi strani, a v manjši meri, so arheološka izkopavanja izvajali G. Stacul z Univerze v Trstu ter G. Cremonesi, C. Pitti in A. M. Radmilli z Univerze v Pisi. Situacija se je nekoliko spremenila v sedemdesetih letih, ko je vodstvo Soprintendenze prevzela F. Maselli Scotti, ki amaterjem v skladu z državnimi zakoni ni dovoljevala, da samostojno izvajajo arheološka izkopavanja. Kljub temu, čeprav redkeje, jamarji še danes odkrivajo arheološke ostanke v jamah in jih v nekaterih primerih tudi načrtno iščejo (glej npr. Rucavina 1996; Marzolini 1998). Med "velike" osebnosti, ki so oblikovale sliko prazgodovine Krasa, nedvomno sodi A. Riedel. Po poklicu je bil geolog, postal pa je izkušen izvedenec za določevanje in analizo favnističnih ostankov. Njemu gre skoraj vsa zasluga za to, da danes razpolagamo s to vrsto podatkov, ki so jo še pred kratkim imeli za drugorazredno (Montagnari Kokelj 1993, 77). Danes potekajo pod vodstvom P. Biagi z Univerze v Benetkah arheološka izkopavanja v jami Stenašca (Grotta dell'Edera), ki so pomembna za razumevanje mezolitika in neolitika na Krasu (Biagi, Starnini, Voytek 1993).

Na jugoslovanski strani Krasa so prva sistematična izkopavanja zgodnjeholocenskih plasti potekala v petdesetih letih, ko je M. Brodar z *Inštituta za arheologijo Znanstvenoraziskovalnega centra SAZU* v Ozki špilji[5] naletel na domnevno mezolitske ostanke. Naslednja izkopavanja, med katerimi so

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[2] Tako npr. za Pečino pod Muzarji, Pejco v Lascu, Pejco na Doleh, Pečino na Leskovcu, Terezijino jamo in Čotarjevo pečino (Barfield 1997-1998; Montagnari Kokelj 1997).

[3] Soprintendenza per i Beni Ambientali, Architettonici, Archeologici, Artistici e Storici (Nadzorništvo za prostorsko, arhitekturno, arheološko, umetnostno in zgodovinsko dediščino).

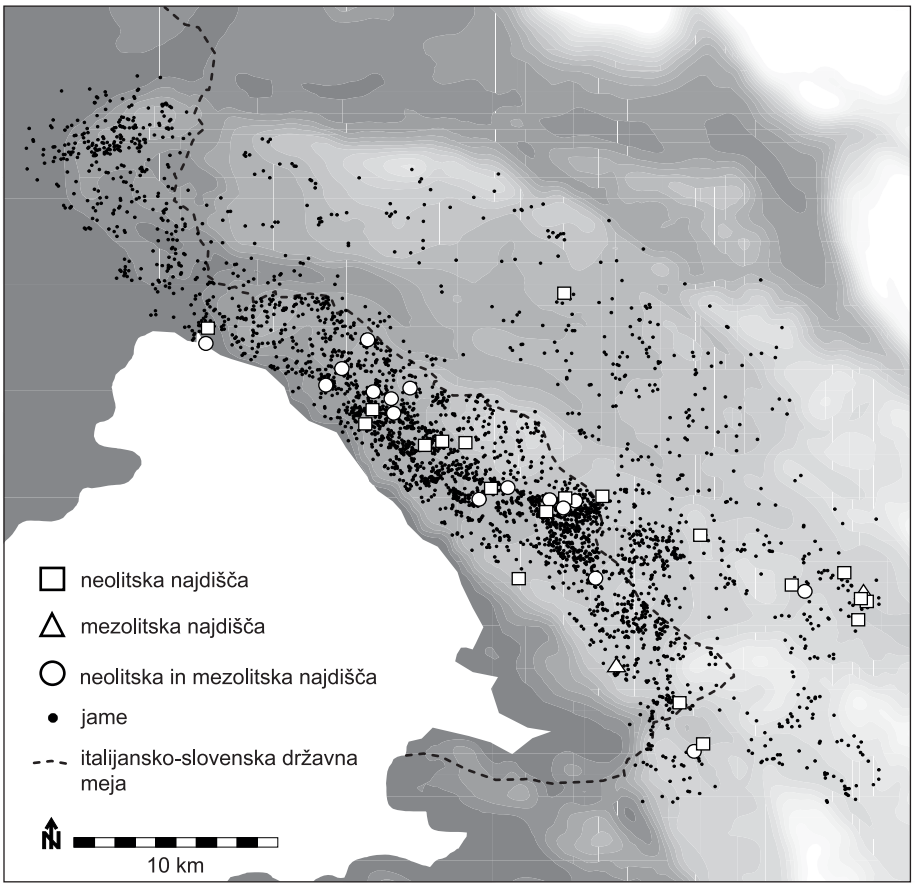
[4] D. Cannarella (1984a, 451) sicer ugotavlja, da " ... comunque, tra questi dilettanti pieni di entusiasmo troviamo anche chi saprà acquisire solide basi scientifiche e qualcuno che passerà alla vera e propria professionalità ...".

na tem delu Krasa prvič odkrili plasti z neolitskimi najdbami, so se iztekla šele leta 1974 v Trhlovci pri Divači. Vodil jih je F. Osole s *Katedre za kvartarologijo Univerze v Ljubljani*. Te raziskave so potekale v duhu širšega projekta odkrivanja paleolitskih postaj v Sloveniji in predvsem na Pivškem. Kmalu po Osoletu je v Trhlovci in Mali Triglavci pričel izkopavati F. Leben, ki je prvič na tem delu Krasa naletel na plasti s številnimi mezolitskimi ostanki. Do nekaterih odkritij je prišlo po zaslugi jamarja in ljubitelja arheologije V. Sakside. Testna izkopavanja je v Acijevem spodmolu in Podmolu pri Kastelcu od leta 1989-1991 opravila ekipa Inštituta za arheologijo Znanstvenoraziskovalnega centra SAZU (Leben 1988; 1990; Turk et al. 1992; 1993).

IDEJE IN TEORIJE O NEOLITIZACIJI KRASA

Pisanje o prvih neolitskih skupnostih na Krasu na podlagi izkopanin ni nova tema, saj so bili prvi poskusi v tej smeri storjeni že proti koncu devetnajstega in predvsem od druge polovice prejšnjega stoletja.

Najstarejša arheološka odkritja v jamah na Krasu so bila odmev širšega kulturnozgodovinskega evropskega konteksta, ko je verižno akcijo arheološkega raziskovanja podzemlja sprožilo odkritje jam s spektakularnimi sledmi *trogloditov* v Franciji in Španiji (Cannarella 1984a). Iskanje arheoloških ostankov v jamah je postajalo vse bolj privlačno in čeprav na Krasu ni doseglo senzacionalnih odkritij, je raziskovalcem le omogočilo spregovoriti o kulturi



Sl. 1: Kraška planota. Označena so mezolitska in neolitska najdišča ter distribucija znanih jam.
Fig. 1: Karst plateau. Mesolithic and Neolithic sites and the distribution of known caves are marked.

[5] Zaradi dejstva, da so bili speleološki, arheološki in geološki podatki večine tu obravnavanih lokacij objavljeni v številnih poljudnih in strokovnih publikacijah, ter glede na narodnost in tudi na politično usmeritev raziskovalcev, tudi v različnih jezikih, najdišča nimajo enega samega imena. Naj navedem le kot primer najdišče, za katero uporabljam ime Pečina na Leskovcu, ki pa je v literaturi poimenovana tudi kot Grotta Azzurra di Samatorza, Höhle bei den Haselstander nach Samatorca, Jepavkna jama, Pečina na Jescoucah, Lescocica, Leskovica oziroma Leskovich in Leskovec, Pečina na Leskovcah, Pečina na Leskovicah, Jama Plava, Caverna presso Samatorza, Caverna presso Samatorizza, Höhle bei Samatorza, Blaue Grotte, Haselnusshöhle itd. Sam uporabljam le tisto ime, ki se mi zdi najbližje slovenskemu izvirniku. Dober pregled imen jam Tržaškega krasa, ki ga v večini primerov tudi sam uporabljam, ponuja P. Guidi (1996).

prvih neolitskih skupnosti. C. Marchesetti je na podlagi izkopanin iz Pečine pod Muzarji (Caverna degli Orsi) rekonstruiral tak profil neolitskega človeka: "... Posvečal se je predvsem pastirstvu in je imel številne črede koz in ovc. Redil je tudi govedo in svinje, čeprav v manjšem številu ... Poljedelstvo mu je bilo neznano, ob srečanju [z divjadjo] ni zavračal lova, ki mu je nudil veliko plena med divjačino v obširnih gozdovih, ki so se širili v okolici njegove votline. Vendar pogosto se je loteval dolgih popotovanj in se je spuščal do morske obale in od njega zahteval dajatve. Ni bil ribič, ... zadovoljeval se je z mehkužci, ki živijo prilepljeni na obalnih skalah, ... ali pa se je potapljal in nabiral tiste, ki živijo v neglobokih vodah ... Čeprav ni imel nobenega znanja o kovinah, je znal učeno uporabljati kamen in kost za izdelavo orožja in za oblikovanje domačih pripomočkov ... Bil je predvsem mojster keramične umetnosti, ki se že kaže kot zelo razvita ... Surovine ..., ki jih ni v naši deželi, je uvažal iz bolj ali manj oddaljenih krajev ..." (Marchesetti 1890, 182-183).[6]

Prve razlage o neolitizaciji Krasa in genezi neolitskih kultur segajo šele v povojni čas. Zanimivo je, da se je s tem prvi spopadel jugoslovanski raziskovalec, J. Korošec, ki je uporabil predvsem podatke z najdišč na Italiji dodeljenem teritoriju (Korošec 1960). Svojo razlago neolitizacije je zgradil le na osnovi keramičnega gradiva iz nekaterih jam, ki ga je bilo treba zaradi nezanesljive stratigrafske provenience "... uporabiti kot celoto, ne glede na to, v kateri jami je bilo najdeno ..." (ib., 8). Neolitsko lončenino je na podlagi tipoloških primerjav razdelil na tri kulturnokronološke skupine. Starejšo skupino določa impresso ali cardium keramika, srednjo keramika danilskega kulturnega kroga, za mlajšo je značilna lončenina hvarske kulture. Korošec ni izključil možnosti obstoja prehodnega obdobja pred neolitikom, ki ga je razumel v obliki akeramičnega neolitika, ta pa pri prehodu naj ne bi bil soudeležen, saj je neolitizacijo razlagal kot posledico priselitve novih ljudi z novo kulturo (ib., 28-29). Zaradi tipološke neprimerljivosti lončenine najstarejše skupine s srednjo je genezo srednje skupine prav tako razložil kot posledico naselitve novih etničnih skupin. Odnos med skupinama bi bil torej ekskluziven. Njegov pogled se je v jugoslovanski arheologiji trdno oprijel, vpliv tega pa je opazen vse do danes (Leben 1979; 1988; Turk et al. 1993).

Od konca petdesetih in na začetku šestdesetih so predvsem v Pečini na Leskovcu (Grotta Azzurra di Samatorza), a tudi v drugih jamah, odkrili ostanke, ki so jih prvič na Krasu določili kot mezolitske. Tedaj predstavljeni pogledi na razvoj kraškega mezolitika so bili v arheologiji široko sprejeti[7] in so se obdržali kot osnovni referenčni okvir za vse naknadne raziskave tja do današnjih dni (Montagnari Kokelj 1993). Prvič so takrat tudi razlagali spremembe v kulturi kot posledico spreminjanja naravnega okolja (Radmilli 1963; Canarella, Cremonesi 1967).

Odkritje mezolitskih ostankov na območju Tržaškega krasa je močno vplivalo na razvoj teorij o procesih neolitizacije. D. Cannarella je tedaj zanikal kontinuiran razvoj iz mezolitika v neolitik, impulze za spremembe pa je za razliko od Korošca iskal v podonavskem prostoru in ne v Dalmaciji. Menil je, da je Kras v neolitiku funkcioniral kot most med Vzhodom in Zahodom, preko katerega so se neolitske kulture širile v bogato italijansko ravnino (Cannarella 1968, 163-165).[8]

V istem času je svoje poglede na genezo kraškega neolitika objavil F. Legnani. Neolitizacijo je obrazložil s prihodom novih ljudi iz Tesalije, ki so na Krasu razvile avtonomno kulturo. Na podlagi tipoloških značilnosti lončenine je to kulturo razdelil na kronološke skupine in podskupine, med katerimi je najstarejšo poimenoval *Kraški neolitik I - čas pokalastih posod*. Kraški neolitik I je obenem razdelil

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[6] Egli si dedicava principalmente alla pastorizia, possedendo numerose gregge di capre e di pecore. Il bue ed il majale venivano del pari allevati, se anche in minor numero ... Ignota gli era l'agricoltura, all'incontro non isdegnava la caccia, che gli offriva larga preda di selvaggina nelle ampie foreste, che si stendevano all'ingiro della sua caverna. Ma egli imprendeva spesso lunghe peregrinazioni e scendeva alla riva del mare per domandargli i suoi tributi. Non era pescatore ... e quindi s'accontentava dei molluschi che vivono attaccati agli scogli della sponda ..., oppure si tuffava in acqua per raccogliere quelli che vivono a poca profondità ... Se anche non aveva alcuna conoscenza dei metalli, egli sapeva adoperare magistralmente la pietra e l'osso a costruire le sue armi, a foggiare i suoi utensili domestici ... Maestro egli ci si rivela specialmente nell'arte del figulo, che appare gia grandemente progredita ... I prodotti di altre terre ... del tutto estranee alla nostra provincia ... dovevano venir importate da più o meno lontane regioni ..." (Marchesetti 1890, 182-183).

[7] Vprašanje obstoja mezolitskih kultur v Italiji je bilo tedaj zelo aktualno. Francoski arheologi so namreč trdili, da se mezolitske kulture (predvsem zgodnji mezolitik - sauveterien in pozni mezolitik - kastelnovien ali tardenoizien) niso razširile na Apeninski polotok, temveč da so tam poznopaleolitske kulture trajale do neolitika. Ta domneva se je italijanskim arheologom zdela nesprejemljiva, zato so od konca petdesetih začeli iskati dokaze za obstoj mezolitskih kultur na Apeninskem polotoku. Njihova pričakovanja so se kmalu uresničila (Radmilli 1963; 1973-1974a; 1973-1974b; 1984b; Andreolotti, Gerdol 1972; Broglio 1980).

[8] Sicer ni jasno, na podlagi katerih podatkov je Cannarella gradil to razlago. Morda je pri tem upošteval predvsem najdbe, o katerih je pisal že Korošec (1960).

na starejšo, *A fazo*, z značilnimi pokalastimi posodami z glajeno površino, ki nastopajo skupaj z lončenino kulture Impresso keramike, ter na mlajšo *B fazo*. V tej bi bili vodilni elementi pokalaste posode z vrezanimi geometričnimi ali naturalističnimi ornamenti, poleg njih pa bi se pojavljala tudi značilna italska srednjeneolitska lončenina (Legnani 1968, 27-29).

Na podlagi gradiva, ki ga je pretežno izkopal K. Moser, je L. Barfield leta 1972 predstavil alternativno razlago neolitizacije Krasa, ki jo uradna arheologija še danes deloma zagovarja in jo uporablja (na primer Gilli, Montagnari Kokelj 1993; 1994-1995; Montagnari Kokelj 1997; Montagnari Kokelj, Crismani 1996; Biagi et al. 1993), predvsem zaradi trdnega tipološkega okvira, ki ga ta razlaga nudi. Barfield je definiral prvotni neolitik s konceptom kulturne skupine *Vlaška*, ki je nastala kot rezultat akulturacije mezolitskih prebivalcev Krasa skozi stik s populacijami, ki so se razvile v Danilo in Kakanj kulturo. Po Bafieldovem mnenju ni mogoče govoriti o starejšem neolitiku na Tržaškem Krasu, ki ga je pred tem določil Korošec, saj je zanikal domnevo, da bi kdaj na Krasu našli odlomke impresso ali cardium lončenine. Ta bi bila na Krasu kvečjemu zastopana kot import v kontekstih skupine Vlaška. Dokaze za kulturno kontinuiteto iz mezolitika je videl v kontinuirani poselitvi istih jam v času trajanja skupine Vlaška, ki so jih uporabljale mezolitske skupnosti, ter v nadaljevanju mezolitske tradicije nabiranja morskih mehkužcev. Menil je, da je skupino Vlaška, kljub njeni v materialni kulturi zasledljivi močni navezanosti s srednjeneolitsko kulturo Danilo, mogoče obravnavati samo po sebi, kaže pa se kot bolj obubožana oblika te kulture. Barfield je torej istovetil genezo skupine Vlaška z neolitizacijo tega prostora. Drugače rečeno, na Krasu se je prva neolitska kultura, ki bi jo karaktariziral popoln neolitski paket, stalno bivanje, poljedelstvo in živinoreja, uporaba glajenega kamenega orodja in keramike, razvila šele v srednjem neolitiku (Barfield 1972, 201-204).

Po Barfieldu je Š. Batović ponovno aktualiziral Koroščev pogled na razvoj neolitika. Povzel je njegovo tridelno delitev, dogajanju dal širši kronološki kontekst, za razliko od Korošca pa je zagovarjal avtohton in kontinuiran kulturni razvoj od mezolitika do železne dobe (Batović 1973, 64-68, 119). Neolitizacijo je razlagal kot posledico avtohtonega razvoja iz mezolitika v starejši neolitik, in zaključil, da "... je domače mezolitsko prebivalstvo nadaljevalo življenje v neolitiku in le sprejelo impresso keramiko kot novo pridobitev širjenja kulture iz Dalmacije na sever oziroma da je domače mezolitsko prebivalstvo s postopnim samostojnim razvojem začelo proizvajati keramiko ..." (ib., 72).

Od polovice sedemdesetih in v osemdesetih večina interpretacij prehoda v neolitik na Krasu pomeni predvsem množico prispevkov, ki pa temeljijo na kombinirani uporabi zgoraj omenjenih konceptov (npr. Steffè de Piero 1978a; Leben 1979; Bagolini, Biagi 1978-1981), in isto velja tudi za razumevanje mezolitika. V osemdesetih se je pozornost številnih raziskovalcev prazgodovine Krasa ponovno usmerila v raziskovanje mezolitskih zapisov. Opravljena so bila številna revizijska izkopavanja, ki pa niso bistveno spremenila dotedanjega vedenja o kraškem mezolitiku. Veliko pozornosti so tedaj dajali sedimentološkim analizam jamskih depozitov (Radmilli 1984a), s katerimi so zbrali obsežno bazo podatkov, rezultatov pa niso znali konstruktivno vključiti v arheološko diskusijo.

V zadnjem desetletju se je pri poskusih razumevanja neolitizacije Krasa vse bolj začenjalo opozarjati na kontekste odkritij arheoloških zapisov, njihovega dokumentiranja in interpretiranja (Montagnari Kokelj 1993; Budja 1993; 1996b). Vse bolj se je zdelo, da je večji del arheoloških podatkov z najdišč na Krasu problematičen in da je mogoče slediti procesom neolitizacije le preko ponovnega prebiranja arheoloških tekstov in revizijske analize med preteklimi izkopavanji odkritega arheološkega gradiva. Novi pogledi so zaradi "labilnega značaja" arheoloških podatkov sprožili novo in ostro debato, katere rezultat je bilo dvoje pojasnitev neolitizacije tega prostora.

Sledeč prvi nastopi neolitik na Tržaškem krasu kot nov kulturni fenomen s skoraj nikakršno povezavo s predhodnim poznim mezolitikom (Montagnari Kokelj 1993, 80). Diskontinuiteto dokazujejo predvsem tipološke študije mezolitskega in neolitskega gradiva ter razlike v uporabi surovin, iz katerih bi izhajalo, da sta si pojava izključujoča. Tako naj bi v Stenašci odlomki lončenine v kastelnovienskem kontekstu odražali bolj sporadične kratkotrajne obiske pripadnikov različnih skupin kot pa kontinuirano izrabo lokacije s strani ene populacije (ib., 81; Montagnari Kokelj et al. 1996, 229-230, 232; Ciccone 1993). Neolitizacija bi tu nastopila pozneje kot na ostalih predelih Jadrana, saj bi Kras še v poznem 6. tisočletju pr. n. š. funkcioniral kot zatočišče lovcev in nabiralcev (Ammerman, Cavalli Sforza 1984; Biagi, Starnini 1997-1998; Chapman, Müller 1990; Müller 1994).

Po drugi pojasnitvi je možno proces neolitizacije opredeliti kot prehod h kmetovanju, ki bi ga bilo na Krasu mogoče prepoznati v mezolitskih kontekstih (Budja 1993; 1996a; 1996b). Ta pristop temelji na podmeni, da je potrebno upoštevati učinek "filtriranega" ali selektivnega prevzemanja posameznih elementov pridelovalnega gospodarstva od

poznomezolitskih lovsko-nabiralniških skupnosti. Na Krasu bi bilo mogoče razbrati zapise (predvsem v obliki ostankov udomačenih živali in lončenine, paleovegetacijskih izsledkov ter prestižnih in simbolnih predmetov), ki opozarjajo, da so tamkajšnje mezolitske skupnosti vzpostavljale kontakte na dolge razdalje in pričele razvijati ali morda selektivno prevzemati pridelovalna gospodarstva. To ugotovitev bi obenem podpirala analiza poselitvenega vzorca na kraškem platoju, ki se v neolitiku ne bi spremenil (Budja 1993, 173-178; 1996a, 64-49; 1996b).

Iz prikazanega izhaja, da sta se pri pojasnjevanju procesa neolitizacije Krasa tradicionalno uveljavila predvsem dva pristopa. Prvi je povezan z genezo kulture impresso - cardium in starejšim neolitikom (Korošec 1960; Leben 1967; 1975; Batović 1973; 1979; Legnani 1968), drugi pa temelji na oceni, da je bil Kras v procesu neolitizacije vzhodne jadranske obale neolitiziran kot zadnji oziroma da se je proces neolitizacije vzhodne jadranske obale končal šele s pojavom skupine Vlaška, ki je kronološko in kulturno razvojno bolj ali manj povezana s srednjeneolitsko kulturo Danilo (Barfield 1972; Chapmann, Müller 1990; Müller 1994). Skupno obema je, da začetek neolitika razlagata predvsem s pojavom lončenine, tudi takrat, ko ta nastopa v mezolitskih kontekstih (Batović 1973). Skoraj vse interpretacije torej temeljijo predvsem na študijah ene zvrsti gradiva, keramike, v veliko manjši meri pa upoštevajo druga pričevanja, kar močno omejuje dojemanje neolitizacije kot procesa prehoda v pridelovalno gospodarstvo. Notranja delitev neolitika prav tako temelji le na razvoju tipoloških značilnostih lončenine, kjer trostopenjsko delitev neolitika določajo diagnostični tipi keramike: impresso cardium keramika označuje zgodnji neolitik, pokalaste posode in rythoni srednji ter npr. hvarska skleda pozni neolitik (Korošec 1960, Batović 1973; Leben 1967; Gilli, Montagnari Kokelj 1992; 1993; Müller 1994). Oba pristopa v osnovi temeljita predvsem na različni interpretaciji odlomkov impresso keramike, ki bi po prvi razlagi dokazovali obstoj zgodnjeneolitske kulture na Krasu, po drugi pa bi bila impresso lončenina le posreden indikator stikov med mezolitskimi ali srednjeneolitskimi kulturami na Krasu in kulturami na vzhodnem Jadranu (npr. Barfield 1972; Müller 1994).

Na Krasu je bila lončenina z impresso ornamentom odkrita v neznanih stratigrafskih kontekstih v različnih jamah,[9] kar pomeni, da je danes njihova kontekstualna interpretacija nemogoča (Montagnari Kokelj 1993, 81). Edina izjema sta lahko le fragmenta lončenine z impresso ornamentom oziroma impresso cardium ornamentom, ki sta bila najdena na spodnjem delu plasti E v Pečini na Leskovcu (Cannarella, Cremonesi 1967, 298, t. 5). Skupaj s tema črepinjama so v isti plasti ležali tudi odlomki pokalastih posod, ki so imeli v nekaterih primerih vrezane viseče trikotnike pod ustjem (ib., 16, t. 4). Batović je eno od dveh črepinj z impresso ornamentom skupaj z nekaterimi odlomki pokalastih posod in enega krožnika postavil v drugo stopnjo zgodnjega neolitika (Batović 1973, t. 2: 9-13), isto črepinjo[10] pa je Müller postavil v kontekst skupine Vlaška in zanikal možnost, da bi ti elementi dokazovali zgodnjeneolitsko poselitev jame (Müller 1994, 141). Nespregledljiva je pri tem ocena, da sta oba deloma ignorirala stratigarfski okvir najdb in lončenino obravnavala po tipoloških kriterijih.[11]

Zaradi prevladujoče predpostavke, da so pokalaste posode skupaj z rhytoni diagnostični keramični tipi srednjega neolitika in da so tesno povezani s kulturo Danilo (Barfield 1972; 1997-1998; Steffè de Piero 1978a; Gilli, Montagnari Kokelj 1992; 1993; Montagnari Kokelj, Crismani 1996; Biagi, Starnini, Voytek 1993), se je vse bolj uveljavljala domneva, da se je neolitik na Krasu pričel v času vzhodnojadranskega srednjega neolitika[12] oziroma v prehodnih fazah zgodnjega neolitika (Bagolini, Bressan 1994, 67). Legnanijeva hipoteza o prisotnosti pokalastih posod že v zgodnjem neolitiku (Legnani

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[9] Seznami kraških najdišč z impresso keramiko se od avtorja do avtorja razlikujejo. V Lebnovem in Müllerjevem seznamu so najdišča Pejca v Lascu, Pečina pod Steno, Pejca v Zavodu, Pečina pod Muzarji in Pečina na Leskovcu (Leben 1975, 145-146; Müller 1994, 310-311). Montagnari Kokelj in Crismani (1993, op. 13) ne navajata Pejce v Zavodu temveč Orehovo Pejco. Batović poleg omenjenih navaja tudi jamo Grotta Gialla (Batović 1973, 64). Velušček meni, da v Pejci v Lascu ta tip keramike ni bil najden (Velušček 1997).

[10] Poleg dveh črepinj z impresso okrasom (Cannarella, Cremonesi 1967, 298, t. 5: 1,2) Müller navaja še en odlomek, za katerega trdi, da ima impresso (cardium?) ornament (Müller 1994, 141. op. 163). V resnici ima ta odlomek le vrezane vzporedne linije (Cannarlla, Cremonesi 1967, 296, t. 4: 5).

[11] Batović je npr. gradivo iz plasti E umestil v različne faze zgodnjega, srednjega in tudi poznega neolitika (Batović 1973, t. 2; 4; 5 in 9), Müller pa npr. ni upošteval dejstva, da je bila v isti plasti najdena posoda s slikanim ornamentom (Müller 1994, 141 in 191; glej tudi Cannarella, Cremonesi 1967, 296, t. 4: 4).

[12] V resnici je videti, da vodilno obliko lončenine skupine Vlaška, pokalasto posodo z značilnimi vrezanimi okrasi v motivu visečih trikotnikov, med lončenino danilskih kontekstov najdemo le redko (Tomaž 1999, 54-55), redka je tudi zastopanost slikane keramike v artefaktnih zbirih tržaških jam (npr. Cannarella, Cremonesi 1967, 296), ki pa je značilna za lončeninske zbire kulture Danilo.

1968) je ostala v ozadju (Bagolini, Biagi 1978-1981, 192), kljub temu da je bil njegov pogled pozneje tudi deloma potrjen.[13] Poleg črepinj z impresso cardium ornamentom v kontekstu s pokalastimi posodami iz plasti E v Pečini na Leskovcu opozarjajo na možnost zgodnjeneolitske umestitve pokalastih posod tudi drugi argumenti. Eden od teh je najdba odlomkov lončenine, ki so okrašeni v t. i. tehniki barbotin v najstarejših neolitskih kontekstih Trhlovce (Tomaž 1999), v Pečini v Gmajni (Grotta Gigante, Andreolotti, Stradi 1971, 112, t. 4) in morda tudi v Mali Triglavci ter v Pejci v Lascu (Grotta del Pettirosso, Tomaž 1999, 56). Barbotin je dokumentiran v najstarejših kontekstih Albanije (Korkuti 1995), najbliže Krasu pa zanj najdemo ustrezne primerjave v zgodnjeneolitskih kontekstih Impresso - Starčeva, dalje pa tudi v najstarejših kontekstih južnega Balkana (Andreolotti, Stradi 1971, 112; Tomaž 1999, 56, op. 266). V kontekstih impresso cardium kulture na vzhodnojadranski obali poleg impresso lončenine pogosto nastopa tudi lončenina, ki je okrašena s tehniko metličenja (Müller 1991, 317, 327; 1994, 117, 119, 126-127, 310-344), zato sta Korošec (1960, 9, 13-14) in Leben (1967, 65-57) utemeljevala obstoj zgodnjega neolitika na Krasu tudi s tem tipom okrasa. Odlomki lončenine z metličeno površino so bili skupaj s pokalastimi posodami najdeni v številnih jamah na Krasu, v Podmolu pri Kastelcu (Turk et al. 1993, 58-59), Pejci na Doleh (Caverna Moser, Barfield 1997-1998, 31-38), Podmolu pri Repentabru (Riparo di Monrupino, Bertoldi 1994-1995, 152), jami Mitrej (Grotta del Dio Mithra, Stacul 1971-1972, 48-49) in Pejci v Lascu (Korošec 1960, 13-14). Vsekakor je videti, da metličenja in barbotina ne moremo vezati na ozko periodo, saj se pojavljata v daljšem časovnem obdobju (Pergar 2002; Radmilli 1982-1986, 159; Stacul 1982, 58-59; Tomaž 1999, 53; Velušček 1995), tako da ostaja ta argument pri nakazovanju arhaičnosti lončeninskih skupkov na Krasu na nivoju hipoteze.

Debata o prvem pojavu lončenine na Krasu se izkaže bolj zanimiva, če vanjo vključimo podatke iz jame Stenašca. V Stenašci so v poznomezolitski plasti 3a, ki jo določajo geometrična kamena orodja, odkrili tudi odlomke neornamentirane lončenine (Biagi, Starnini, Voytek 1993, 61). Nad njo je ležala neolitska plast 2a, v kateri so ob najglobljem ognjišču našli ostanke tipičnega danilskega rhytona, za katerega se je na podlagi arheometričnih analiz izkazalo, da je lokalen proizvod (Spataro 1997-1998, 87). Lončenina v tej plasti se povsem razlikuje od tiste iz plasti 3a; poleg fragmentov značilnih posod, ki tipološko ustrezajo lončenini skupine Vlaška, so v njej našli tudi fragment zajemalke z dulcem (Biagi, Starnini, Voytek 1993, 61).

Kot je bilo pred tem rečeno, naj bi najstarejši pojav lončenine na Krasu bil vezan na zgodnjeneolitske (kultura impresso) ali srednjeneolitske (skupina Vlaška) kontekste. Ponovno se vrnimo na edini primer najdbe impresso lončenine v znanem stratigrafskem kontekstu (plast E v Pečini na Leskovcu). Vsi avtorji so si glede te najdbe enotni v tem, da je ta lončenina v vsakem primeru vezana na pomezolitsko poselitev jame (Cannarella, Cremonesi 1967; Batović 1973, 66-68; Müller 1994, 141, 191). Lahko torej upravičeno trdimo, da impresso cardium ornament ne označuje najstarejšega tipa lončenine na Krasu, kar je sicer že dokazal tudi Müller (1994). Isto velja tudi za ostale domnevno najstarejše tipe, tj. za odlomke lončenine z barbotin ali metličenim ornamentom. Tip najstarejše lončenine moramo videti v poznomezolitskih kontekstih Stenašce, kjer pa gre za monohromno neornamentirano keramiko (Biagi, Starnini, Voytek 1993, 61; glej tudi Parzinger 1993, 53, 77-79).

Razpravo lahko naprej razvijamo s pomočjo radiokarbonskih datacij.[14] Zanimiva razmerja se namreč vzpostavijo če primerjamo 14C datacije najstarejših neolitskih kontekstov s pokalastimi posodami in odlomki rhytonov na Krasu z zgodnjeneolitskimi iz Istre (Vižula). Najstarejši radiokarbonsko datiran neolitski kontekst na Krasu (Stenašca, plast 2a) je postavljen v čas 6615 ± 390 BP (GX-19568) oziroma 6590 ± 100 BP (GrN-23129) in leži nad plastjo, v kateri je bila najdena monohromna neornamentirana keramika skupaj z geometričnimi orodji (plast 3a), ki je datirana v čas 6700 ± 130 BP (GX-19569) (Biagi, Starnini, Voytek 1993, 61; Spataro 1997-1998, 66). Najstarejša lončenina iz te jame je torej kronološko primerljiva s tisto, ki jo je Müller umestil v njegovo "impresso A stopnjo" (Budja 1996a, 325), najstarejši neolitski zapis iz plast 2a pa je starejši od srednje neolitske kulture Danilo.[15] Izkaže se torej, da je povezovanje pokalastih posod in rhytonov s to kulturo vprašljiva, in da je v povezavi s tem treba iskati začetke neolitika na

[13] Tako v jami Ansa, kjer je bil del keramičnega in kamenega gradiva tipološko primerljiv z zgodnjeneolitskim gradivom v najdiščih na vzhodni in zahodni jadranski obali (Visentini 1992; 199-201).

[14] Tega tipa podatkov se poslužujejo predvsem avtorji, ki zagovarjajo postopno širitev neolitika iz južnega Jadrana proti severu ter pozen pojav lončenine na območju severnega Jadrana (Ammerman, Cavalli-Sforza 1984; Breunig 1987; Chapman, Müller 1990; Müller 1991, 329. Glej tudi Budja 1993; 1996b).

[15] Najstarejšo datacijo te kulture imamo v Gudnji pećini in sega v čas 6520 ± 40 BP (5490-5380) cal. BC (Müller 1994, 350).

Krasu v periodah pred začetkom vzhodno-jadranske srednjeneolitske kulture Danilo. Ta domneva je toliko bolj upravičena, če upoštevamo podatke o pojavu prvih udomačenih živali v poznomezolitskih kontekstih v jamah na Krasu, med katerimi je eden med temi v Pejci na Sedlu (Grotta Benussi) datiran že v čas med 7620 ± 150 BP (6600-6270 (6464) cal. BC) in 7050 ± 60 BP (5991-5824 (5933) cal. BC) (Riedel 1975; Biagi 1994, 60).

Zanimiva se izkaže tudi primerjava časa pojavitve neolitika na Krasu in v sosednji Furlaniji. Če si ogledamo začetke neolitika vzdolž zahodne obale Srednjega in Severnega Jadrana, nam razpoložljivi C^{14} datumi kažejo, da je nekdaj očiten kronološki gradient jug-sever (Bagolini, Biagi 1990) izginil. Prve kmetijske naselbine z območja Abruzzov in March so, vsaj kar zadeva radiokarbonske datacije, sočasne s prvimi kmetijskimi naselji v severovzhodni Italiji, na Krasu in v Padski nižini (Pessina, Rottoli 1996, 97; Improta, Pessina 1999, 112). V Furlaniji imamo najstarejšo C14 datacijo za zgodnji neolitik v Piancadi, ki ji sledita dataciji iz Sammardenchie in Fagnigole.[16] Te datacije kažejo, da je pojav neolitika na Krasu (plasti 2a v Stenašci) istočasen z začetkom neolitika v Furlaniji, kjer pa se za razliko od Krasa že takrat kaže kot trdno ustaljen fenomen[17] (Ferrari, Pessina 1996; Pessina, Rottoli 1996; Pessina, Muscio 1999).

Vprašanje, ki si ga na tem mestu postavljam, je, ali je na podlagi povedanega danes še upravičeno označevati pojav neolitika na Krasu s srednjeneolitsko skupino Vlaška. Videti je namreč, da začetka neolitika na Krasu ne gre vezati s srednjim neolitikom, in to ne v smislu vzhodnojadranskega in niti zahodnojadranskega neolitika. Genetska navezava te skupine s kulturo Danilo je prav tako vprašljiva. Nespregledljivo je tudi, da se za razliko od zgodnjega neolitika v Furlaniji in tistega na vzhodnem Jadranu, skupina Vlaška ne kaže kot ustaljen neolitski fenomen. Na Krasu neolitska naselja niso dokumentirana (Montagnari Kokelj 1993), prav tako ni (še dolgo naprej) dokumentirana uporaba udomačenih rastlin (Turk et al. 1993, 71; Budja 1996b, 68). Videti je, da se strategije izrabe prostora s prehodom iz mezolitika v neolitik bistveno ne spremenijo (Budja 1996b, 68-69). Zgodnji neolitik na Krasu se torej ne kaže kot "popolnoma neolitski" fenomen, kot npr. ta, ki ga označujejo skupine v sosednji Furlaniji, temveč gre za fenomen, ki ga sicer lahko že imenujemo neolitski, a ga moramo razumeti kot ustaljeno in dolgotrajno fazo v procesu prehoda.

KRITIČNA ANALIZA STRATIGRAFSKE KONTEKSTUALNOSTI MEZOLITSKIH IN NEOLITSKIH ZAPISOV NA KRASU

Neolitizacija Krasa je danes "vroča" tema (Budja 1993; 1996a; 1996b; Montagnari Kokelj 1993; Müller 1994; Velušček 1995). Razlog za to ni odkrivanje novih podatkov, ki bi ogenj vzdrževali, temveč možnost različne uporabe starih podatkov. Zaradi kontekstov, v katerih so jih zbirali,[18] lahko namreč iste podatke uporabimo na različne načine - tudi za dokazovanje nasprotujočih si teorij.[19] Zato je bil prvotni namen tega prispevka preveriti ter oceniti zanesljivost in uporabnost tistih objavljenih podatkov, ki so pomembni za razumevanje neolitizacije Krasa.

Zasledovanje zapisov, ki bi govorili o procesih neolitizacije, ni lahka naloga. Predvsem pa je ta naloga na Krasu še v povojih. Pri prepoznavanju neolitizacijskih procesov se mi zdi ključno to, da se razpolaga s kontekstualnimi podatki. Zaradi tipa podatkov, s katerimi sam razpolagam, sem bil primoran pomen *konteksta* zožiti na najosnovnejše in zelo omejene parametre. Ena od možnosti za zamejevanje in določanje konteksta najdbam, katerih se lahko poslužujem, saj mi objave najdišč na Krasu to omogočajo, je uporaba okvira, ki ga določajo posamezne stratigrafske enote znotraj arheološkega depozita. Drugače rečeno, procesu neolitizacije lahko "objektivno" sledimo le, če upoštevamo tiste arheološke zapise, katerih stratigrafski kontekst je znan. Tiste vsebine, ki bi sicer lahko bile relevantne za razumevanje neolitizacijskih procesov, a nimajo

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[16] Piancada: vzorec R-2705 6751 ± 108 BP (5691-5525 cal. BC); Sammardenchia vzorec R-2547 6570 ± 74 BP (5569-5434 cal. BC); Fagnigola R-2547 6570 ± 75 BP (5565-5433 cal. BC) (Improta, Pessina 1999, 109).

[17] Za zgodnjeneolitske skupine v Padski nižini in Furlaniji je značilno: a) splošna prisotnost multicerealne kmetijske ekonomije skupaj z gojenjem stročnic, b) obstoj velikih naselij s hišami in jarki, c) prisotnost tipičnih neolitskih elementov, kot so glinene ženske figurice, ki pričajo o ideološkem svetu, nepoznanem mezolitski družbi, d) sprememba v provenienci surovine glede na mezolitsko periodo, uporaba kremena z območja Monti Lessini ter posameznih orodij iz obsidiana, e) trgovina na dolge razdalje in f) na podlagi kroženja lončenine, tesni stiki med neolitskimi skupnostmi (Pessina, Rottoli 1996, 95).

[18] Tu mislim predvsem na uporabo različnih metod izkopavanj in na njihovo kakovost.

[19] Kot primer naj omenim le situacijo, pri kateri so različni raziskovalci različno obravnavali odlomke lončenine z impresso ornamenti: kot dokaz za obstoj impresso kulture na Krasu (Korošec 1960), kot import v srednjeneolitskih ali mezolitskih kontekstih (Müller 1991) oziroma zanikanje, da bi bili taki odlomki na Krasu sploh najdeni (Barfield 1972). Takšno množico razlag je bilo mogoče zagovarjati predvsem zato, ker je večina odlomkov z impresso ornamenti brez stratigrafskih kontekstov in jim je torej nemogoče določiti tudi arheološki kontekst.

stratigrafskega konteksta, so po mojem mnenju pri taki temi in pri reševanju zelo specifičnih arheoloških problemov, neuporabne.

Preden bi spregovoril o stratigrafiji posameznih mezolitskih in neolitskih najdišč na Krasu,[20] bi rad opozoril na okoliščine, v katerih so se arheološki podatki zbirali. Ne morem mimo dejstva, da je bilo eno od gibal večine izkopavanj v teh najdiščih iskanje specifičnih artefaktov iz preteklosti. Izkopavalce so zanimala predvsem kamena orodja, odlomki lepših oblik lončenine ali odlomki z ornamenti, okrasni predmeti, skratka vse to, kar se v nekaterih primerih v arheološki praksi še danes označuje kot *posebna najdba*. Drugo gradivo ni vzbujalo veliko zanimanja; fragmentov kosti, kamenih odbitkov, neornamentiranih odlomkov sten lončenih posod včasih sploh niso pobirali.[21] Še manjše je bilo zanimanje za zbiranje paleobotaničnih, geomorfoloških in sedimentoloških podatkov. Šele izkušnja raziskovanja depozitov z mezolitskimi najdbami je to stanje nekoliko spremenila in od 80-tih let dalje vzbudila zanimanje tudi za te informacije (Montagnari Kokelj 1993, 77) ter skladno s tem tudi za arheološko stratigrafijo v najdiščih. Žal so bile te raziskave usmerjene le v preučevanje mezolitika, pri izkopavanjih so res začeli upoštevati tudi druge vire podatkov in skušali čim bolje rekonstruirati prazgodovinsko stanje, res pa je tudi, da so popolnoma zanemarili druga arheološka obdobja. Priložnost zasledovanja procesov neolitizacije je bila ponovno izgubljena.

Največja ovira, zaradi katere se danes s tako težavo spregovori ne le o neolitizaciji Krasa, ampak tudi o drugih arheoloških problemih na tem področju (cf. Carpani 1999), je pomanjkanje prav tistega najožjega konteksta, o katerem sem prej spregovoril. To stanje je vezano na zgodovinski razvoj metod poseganja v arheološke plasti, in predvsem na bolj ali manj veliko zamudo pri uporabi sodobnih metod izkopavanja na Krasu. To je stanje, ki ga gre verjetno vezati z dejstvom, da so bili raziskovalci večinoma amaterji.

Pomanjkanje podatkov o stratigrafski strukturiranosti arheoloških depozitov močno občutimo pri najdiščih, ki so bila raziskana v času pred drugo svetovno vojno. Iz Marchesettijevih ali Moserjevih poročil težko razberemo, kakšna je bila njihova metoda poseganja v depozite in kakšen je bil tip dokumentiranja, ki sta ga na terenu opravljala. V bolj izčrpnih prispevkih o najdiščih, ki so za temo te naloge pomembna (npr. Moser 1899; 1903a; 1903b; Marchesetti 1890; 1895), takih podatkov ne navajata. Glede na obseg njunih izkopavanj, ki so bila navadno kratkotrajna, bi se lahko sklepalo, da je vsaj do neke mere šlo za prekopavanje depozita in iskanje zanimivih ostankov iz preteklosti; ostankov, ki pa sta jih analizirala in interpretirala. Oba opisujeta stratigrafijo jamskih depozitov, zelo verjetno pa sta nanjo gledala z očmi geologije. Najdb nista obravnavala po stratigrafskih kontekstih, in isto velja tudi za najdbe, ki jih opisuje R. Battaglia (Battaglia 1927).

Najbolj očiten primer takega stanja in posledic tega je Pejca v Lascu, najdišče, ki ga je večina avtorjev vključevala v razprave o neolitizaciji Krasa, predvsem zaradi domneve, da je v njih Moser našel fragmente lončenine z impresso cardium ornamentom (Korošec 1960; Leben 1967, 65-68; Batović 1973). Če ostaja vprašanje resničnosti tega odkritja danes še odprto (Velušček 1997), se je vendar izkazalo, da je Moser v tej jami našel veliko fragmentov lončenine, ki je značilna za najstarejše neolitske kontekste na Krasu (Barfield 1997-1998, 22-31). Največja ovira pri tem najdišču je, da nobene od najdb ne moremo pripisati eni od odkopanih in dokumentiranih plasti (ib., 20), kar pomeni, da ne vemo katere najdbe spadajo v kontekst ene plasti. Zaradi tega ostajajo podatki iz Pejce v Lascu žal zaenkrat dvomljivi in zato pri poskusu razlage neolitizacije Krasa neuporabni. Podobno ne moremo razlag graditi na podlagi podatkov iz ostalih jam, v katerih je izkopaval Moser, tako npr. tistih iz Terezijine jame (Grotta Teresiana),[22] Čotarjeve pečine (Caverna Cotariova)[23] in Pejce na Doleh.[24] Podatki, ki jih za Pečino pod Muzarji navaja

[20] Obravnavati poskušam vsa objavljena najdišča, v katerih so odkrili mezolitske in (ali) neolitske ostanke. To predvsem zato, ker menim, da je potencialno v vsakem mezolitskem in neolitskem zapisu možno zaslediti elemente, ki bi lahko pripomogli k razumevanju neolitizacije nekega območja.

[21] V nekaterih jamah, kjer so potekala arheološka izkopavanja, je še danes mogoče naleteti na kupe fragmentov kosti, ki so jih izločili od ostalega, vrednejšega gradiva. Kosti, odbitkov in še marsičesa je veliko tudi v deponijah, ki so nastajale med izkopavanji.

[22] V tej jami K. Moser izkopal 9 različnih plasti (Moser 1903a, t. 7) ter odkril tipične ostanke najstarejšega neolitika na Krasu. Verjetno je v jami naletel tudi na plasti z mezolitskimi najdbami (Leben 1967, 70-71; Cannarella 1975-1977, 88; Barfield 1997-1998, 40-50).

[23] Tu je K. Moser skupaj s M. Hofmannom odkril tudi fragmente neolitske lončenine, med katero so bili odlomki posod z vrezanim ali slikanim ornamentom (Barfield 1997-1998, 50-56). Odlomke neolitske lončenine je v jami izkopal tudi B. Lonza, ki je odkril tudi kopači iz jelenovega rogovja (Cannarella 1975-1977, 76; glej tudi Budja 1993, 178; Velušček 1997).

[24] Tudi v tej jami je Moser naletel na več arheoloških plasti (Moser 1903b, t. 25; 26). Odkril je dva groba, ki jima je, zaradi odsotnosti lončenine, določil predneolitsko starost. Prvega so prekrivali kamniti bloki, nad katerimi je bila plast, ki je med drugim hranila tudi odlomke lončenine. Okrog skeleta so ležali fragmenti čeljusti vidre (*Lutra lutra*), oklep kornjače (*Testudo sp.*), fragmenti

Marchesetti,[25] so prav tako dvomljivi, saj najdbam tudi v tem primeru ni bila določena stratigrafska provenienca (Montagnari Kokelj 1997, 65).

Poskusi revizijskih analiz gradiva, ki je bilo pridobljeno v takšnih okoliščinah, uporabnosti in izpovednosti podatkov, ki bi lahko bili relevantni pri razumevanju procesov neolitizacije, bistveno ne spremenijo. Primer tega je izčrpna revizijska objava za razumevanje neolitizacije Krasa potencialno pomembnega gradiva iz Pečine pod Steno (Grotta delle Gallerie, Gilli, Montagnari Kokelj 1993). Težave, ki se tu skrivajo, so navidezno sekundarnega pomena in vsekakor premostljive (ib., 180-181). Pomanjkanje stratigrafskih kontekstov najdb, pomešanost gradiva, pomanjkanje kvalitetnih podatkov o izkopavanjih je po mnenju E. Gilli in E. Montagnari Kokelj mogoče preseči z uporabo "... analitičnih tipologij, ki jih je treba za neolitsko in zgodnje bronastodobno keramično gradivo iz Tržaškega krasa vsekakor še definirati ..." (Gilli, Montagnari Kokelj 1992, 67). Analitična tipologija je po njunem mnenju orodje, s katerem je mogoče poiskati arheološkemu gradivu iz Pečine pod Steno tak kontekst, v katerem bi bilo možno prepoznavati sledi procesov, ki so privedli do "neolitskega stanja". Sam menim, da analitična tipologija ni orodje, s katerim bi bilo mogoče rekonstruirati arheološke kontekste in predvsem zapise o neolitizacijskih procesih v njih. Ekskluzivna uporaba analitične tipologije pomeni razbijanje realnih stratigrafskih in arheoloških kontekstov ter ustvarja le orodja, s katerimi se te kontekste ponovno (umetno) izgrajuje.[26] Rezultat so skupki podobnosti in razlik, ne pa arheološki konteksti, in v te skupke zgoraj omenjeni avtorici vsiljujeta tudi tiste redke ostanke, katerih stratigrafski kontekst je znan (Gilli, Montagnari Kokelj 1993, 160). Predvsem zaradi tega se mi zdijo objavljeni podatki iz Pečine pod Steno za razumevanje neolitizacijskih procesov neuporabni.

Pečina pod Steno je le zelo očiten primer stanja, ki žal velja tudi za številna druga najdišča. V teh arheološke ostanke definirata dva konteksta, ki se lahko kombinirata: stratumski in tipološki. Ta pristop je v prvi vrsti vezan na fazo zgodovinskega razvoja strategij in metod arheološkega izkopavanja, ko je arheologija prisegala na t. i. *arbitrarno metodo izkopavanja* (Harris 1989, 31-37). Navadno je šlo za poseganje v depozit najdišča z izmerjenimi, pogosto vodoravnimi režnji (stratumi) vnaprej določene debeline, in to metodo so raziskovalci jamskih najdišč na Krasu največkrat uporabljali. Individualnih oblik plasti niso upoštevali, tako da so z enim režnjem lahko odstranili več plasti ali njihovih delov hkrati. Režnje so na podlagi konsistence arheoloških najdb obravnavali kot naravne (arheološko sterilne) ali arheološke plasti, kot stratigrafske enote, ki so zamejevale arheološke vsebine in jim dajali kronološko in kulturno vrednost. Originalno stratigrafsko sekvenco v najdiščih so preorganizirali v stratumsko sekvenco, ki je arheološkemu zapisu dajala nov, stratumski kontekst.

Posledice, ki jih lahko povzroča uporaba metode arbitrarnega izkopavanja, so lepo vidne v Ciganski jami (Caverna degli Zingari), za prazgodovino Krasa zelo pomembnem najdišču.[27] Če primerjamo pisne in grafične opise stratigrafske sekvence jamskega depozita (Marzolini 1971-1972, 58-59) ugotovimo, da so izkopavalci s posameznimi režnji odstranili več stratigrafskih enot hkrati (*sl. 2*). Z režnjema 7 in 6 so izkopali vsaj štiri različne plasti, s 5. režnjem pa so, če ne upoštevamo vseh lečastih belkastih in črnikastih plasti, posegli v vsaj pet različnih plasti. Med temi so tudi take, ki segajo globlje in so bile izkopane s 6. režnjem, ter take, ki so se dvigale in deloma ležale više in ki so jih pred tem deloma odstranili s 4. režnjem (Marzolini 1971-1972, 58-59, 99).

S 5. režnjem so torej izkopali ostanke iz različnih plasti, kar pomeni, da so bile z oznako tega režnja označene najdbe iz različnih obdobij. Najdbam iz različnih stratigrafskih enot so določili nov kontekst, ki so ga definirali prevladujoči elementi, diagnostične

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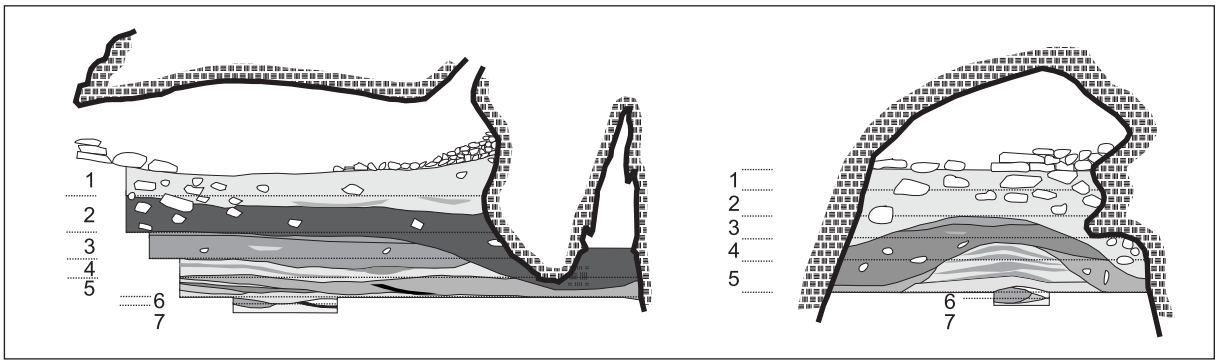
lupin škržkov (npr. *Unio margaritifer*) ter kameni in koščeni artefakti. Drugi skelet je ležal v isti plasti kot prvi, od vrhnje plasti z lončenino pa ga je ločeval tanek pepelnat sloj. V tem grobu so pod lobanjo in mečnico ležale lupine rečnih mehkužcev ter roženi in kameni artefakti, ob očesnih votlinah pa so ležali kameni odbitki, rožen artefakt in dve razklani kosti (Leben 1967, 60). Med lončenino, ki jo je izkopal v zgornjih plasteh, je tudi nekaj odlomkov pokalastih posod in rhytonov (Barfield 1997-1998, 31-38).

[25] Tudi tu so izkopane najdbe značilne za najstarejše neolitske faze poselitve jam na Krasu (Montagnari Kokelj 1997, 71). Kot navajata F. Leben (1967, 57; 1975, 145-146) in J. Müller (1994, 310-311), so v jami našli fragment lončenine z vbodi, ki bi bil primerljiv s keramiko kulture impresso cardium v Dalmaciji.

[26] Tako orodje je neolitski paket, koncept, ki določa, da je pojav lončenine, udomačenih rastlin in živali ter glajenega orodja vezan na neolitske vsebine. Ti elementi v predneolitskih plasteh naj ne bi nastopali, zato bi jih šlo v takih primerih obravnavati kot infiltrirane iz zgornjih plasti (glej npr. tudi Cremonesi 1984, 67; Cremonesi et al. 1984, 32; Cannarella, Pitti 1978-1981, 18).

[27] V jami je bila dokumentirana z arheološkimi najdbami zelo bogata neolitska plast tik nad mezolitsko (Marzolini 1971-1972, 99-101; Gilli, Montagnari Kokelj 1994-1995; Bon 1994-1995, 127). Po mnenju E. Gilli in E. Montagnari Kokelj (1994-1955, 115-116) v neolitski plasti ni bilo elementov, ki bi kazali na nadaljevanje starejših tradicij, prav tako ni bilo lončenine, ki bi bila primerljiva s tisto iz kuture impresso cardium keramike ali s tisto iz faze monohromne keramike.



Sl. 2: Prečni in vzdolžni profil arheološkega depozita v Ciganski jami (po Marzolini 1971-1972, 59). S pikčastimi črtami so označene meje arbitrarnih režnjev (1-7).
Fig. 2: Transverse and horizontal profiles of the archaeological deposits in Ciganska jama (according to Marzolini 1971-1972, 59). Dotted lines mark the boundaries of the arbitrary spits (1-7).

najdbe. 5. reženj je postal "neolitski", "neolitske" so torej postale vse najdbe, ki so jih izkopali s tem režnjem. Kljub temu pa so tiste najdbe, ki tipološko niso ustrezale neolitiku, na podlagi analitične tipologije izločili iz neolitskega stratuma ter jih postavili v *pravilen* kontekst[28] (Gilli, Montagnari Kokelj 1994-1995, 116-117). Rezultat je serija umetnih kontekstov, ki ne odražajo realnega stanja, zato podatkov iz te jame po mojem mnenju pri reševanju arheoloških problemov ne moremo uporabljati. Podobne ugotovitve veljajo tudi za druga, prav tako zelo znana mezolitska oziroma neolitska najdišča, npr. za Orehovo pejco (Grotta dei Ciclami), Pečino na Leskovcu (izkopavanja 1982), Podmol pri Repentabru, jamo Ansa (Grotta dell'Ansa), Katrno pejco (Caverna Caterina), Pečino v Gmajni, Spodmol v Podpečini (Cavernetta della Trincea, Andreolotti, Stradi 1964), Trhlovco, Malo Triglavco in Acijev spodmol (glej Fabec 2000, 41-60).

Verodostojni bi lahko bili podatki z najdišč, v katerih so naleteli na le eno arheološko plast oziroma kjer so med arheološkimi plastmi ležale naravne ali, kot je navedeno v literaturi, *arheološko sterilne* plasti. Taki sedimenti so pri uporabi metode izkopavanja z arbitrarnimi režnji navadno olajšali prepoznavanje originalnih mej plasti, in poleg tega preprečevali, da bi z enim režnjem hkrati posegli v več plasti z najdbami. Lahko jih torej štejemo kot "izolacijske pasove", ki so pečatili arheološke kontekste, in do neke mere preprečili *pravilno* preureditev arheoloških ostankov po stratumskih kontekstih.

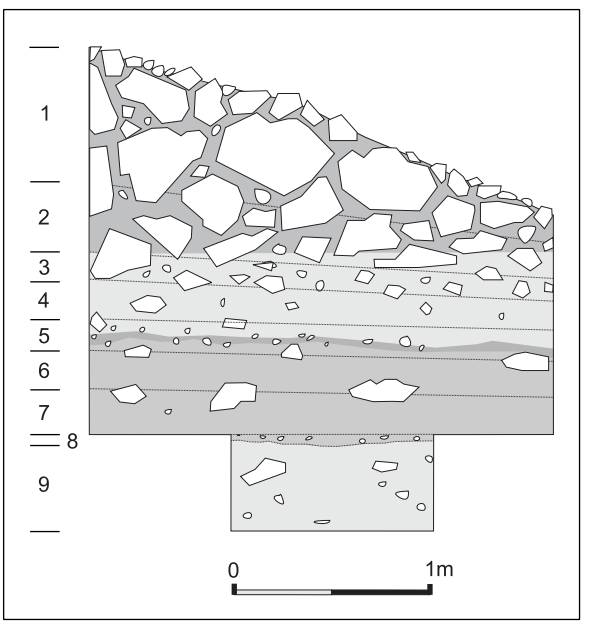
Idealno situacijo, ko bi ležala arheološka plast med naravnima, v najdiščih na Krasu najdemo le izjemoma. Med taka najdišča nedvomno sodi jama Mitrej (Stacul 1982, 28). G. Stacul je ob jamski steni izkopal testno sondo in naletel na plast z neolitskimi ostanki (plast 8), ki je deloma ležala na arheološko sterilni plasti ilovice (plast 9) in deloma na jamski steni. Na celotnem izkopnem polju je osmo plast prekrivala 10 cm debela arheološko sterilna kompaktna plast.[29] Obenem se zdi, da je bil Stacul do stratigrafije še posebno pozoren in se je dobro zavedal njenega kontekstualnega pomena (glej tudi Radmilli 1978-1981; Stacul 1982; 1985-1987). Iz obeh razlogov menim, da so ti podatki v celoti uporabni. Podobno situacijo srečamo tudi v Jami v Malalanovem dolu (Cavernetta Malalan, Maselli Scotti 1981-1982).

V nekaterih primerih arbitrarne režnje kljub njihovi "arbitrarnosti" lahko obravnavamo kot vzorce vsebin posameznih plasti ter kot kazalce relativnih sprememb med arheološkimi zapisi v nekem najdišču, njihova vrednost je v tem primeru odvisna predvsem od oblike (vodoravnosti) in debeline plasti v stratigrafski sekvenci. Tako situacijo srečamo npr. v Pejci na Sedlu. Tudi tu so jamski depozit raziskali z metodo arbitrarnih režnjev, kar v izhodišču predpostavlja prej omenjene težave pri določanju kontekstov arheoloških ostankov. V Pejci so izkopali devet arbitrarnih režnjev in v najvišjih dveh našli fragmente bronastodobne in mlajše keramike. Redki odlomki lončenine, ki so jih našli na spodnjem

[28] Dualni značaj kamenih orodij iz petega, neolitskega režnja, dolgih klin iz alohtonega kremena na eni strani in majhnih orodij iz manj kvalitetnega lokalnega kremena na drugi (Gilli, Montagnari Kokelj 1994-1995, 66-96), E Gilli in E. Montagnari Kokelj pripisujeta ločeno mezolitskemu oziroma neolitskemu kontekstu. Šlo bi namreč za rezidualne najdbe, ki so v ta reženj zašle zaradi podepozicijskih procesov (ib., 116).
[29] Ni jasno ali gre za antropogeno ali naravno plast. Videti bi bilo vsekakor, da je bolj verjetna druga možnost, kjer bi plast nastala predvsem zaradi dekalcifikacije matične kamnine na stropu (Stacul 1971-1972, 37).

delu drugega režnja, bi lahko bili neolitski. Ostanki iz spodnjih režnjev (3-8) so mezolitski (Andreolotti, Gerdol 1972, 62; Riedel 1975, 138-141). Vse najdbe so bile predstavljene po režnjih, ne pa po stratigrafskih enotah, ki jih je na podlagi opisa plasti in predvsem grafične ponazoritve jamske stratigrafije le mogoče prepoznati in deloma tudi ugotoviti njihovo obliko. Plasti so bile dokaj vodoravne, zaradi česar med stratumskim izkopavanjem v nekaterih primerih niso posegli v depozit različnih plasti hkrati, kar še posebno velja za sedmi, šesti, četrti, morda pa tudi za tretji reženj (sl. 3).

Videti je, da so meje dveh najglobljih režnjev sledile naravnim mejam dveh plasti. Na podlagi primerjave pisnih in grafičnih podatkov o stratigrafiji, bi bilo torej mogoče ugotoviti, da so izkopavalci s sedmim in šestim režnjem izkopali večji del ene same plasti, njen zgornji del pa je bil odstranjen s petim režnjem. Isto bi veljalo tudi za tretji reženj. V takem primeru, ko so z režnjem izkopali le del ene same plasti, stratumskega konteksta ne moremo enačiti s stratigrafskim. Kljub njegovi arteficialnosti, pa taka situacija ne predpostavlja skupnega izkopa



Sl. 3: Profil 20 m^2 velikega izkopnega polja na vhodnem delu Pejce na Sedlu. Meje režnjev so označene z pikčasto črto (po Andreolotti, Gerdol 1972, t. 2). Izkopavalci so s 7., 6., 4. in morda tudi 3. režnjem izkopali del depozita le ene plasti.
Sl. 3: Profile of 20 m^2 excavated area in the entrance part of Pejca na Sedlu. Boundaries of spits are marked with dotted lines (from Andreolotti, Gerdol 1972, t. 2). The excavators excavated part of the deposit of only one layer with spits 7, 6, 4 and perhaps also 3.

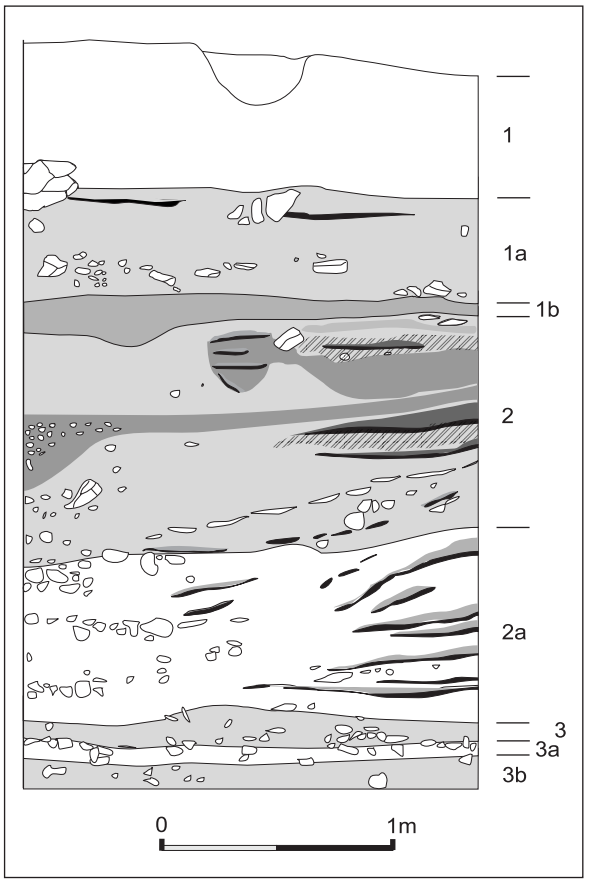
in torej mešanja arheoloških ostankov iz različnih stratigrafskih kontekstov. Če se po svoji naravi arheologija spopada predvsem z vzorčenjem, potem je arheološki zapis v takem specifičnem stratumskem okvirju, kot ga predstavljajo npr. režnji 7, 6, 4 in 3, le vzorec nekega bolj relevantnega vzorca, ki ga daje stratigrafski kontekst (posamezna plast). V tem smislu so podatki iz teh režnjev le del nekega konteksta, ki ni umeten, temveč primaren, in funkcionirajo kot njen težje berljiv in manj reprezentativen vzorec. Podobno lahko ugotovitmo tudi za Pečino Podkičer (Cavernetta ad Est di Trebiciano), Jamo v Zavodu (Grotta della Tartaruga, Cremonesijeva izkopavanja) in Stenašco (izkopavanja v sedemdesetih) (Fabec 2000, 44-48, 59-60).

Primerov, ko so raziskovalci med izkopavanjem sledili naravnim oblikam stratigrafskih enot ter arheološke vsebine določali na podlagi teh, ni veliko. Razlog za to se skriva v zgodovinskem razvoju arheoloških metod izkopavanja oziroma v dejstvu, da se je stratigrafska metoda izkopavanja pri nas začela izvajati dokaj pozno. Primera, kjer bi arheološke vsebine raziskali in dokumentirali z metodo stratigrafskega izkopavanja, nisem zasledil. V nekaterih primerih, npr. v Stenašci in v Podmolu pri Kastelcu ter morda tudi v Pečini na Leskovcu (izkopavanja 1958-1963) je sicer videti, da so arheološke zapise določali stratigrafski konteksti (Fabec 2000, 41-43, 59-61).

V Stenašci so med izkopavanji v sedemdesetih v depozit posegli z arbitrarno določenimi režnji in izkopali arheološke ostanke od mezolitika dalje. Tudi od devetdesettih dalje so, kljub temu da so se zavedali pomena stratigrafske kontekstualnosti, plasti še vedno izkopavali z režnji (Biagi, Starnini, Voytek 1993, 61; Spataro 1997-1998, 66), vendar so ti bili le metoda izkopavanja, dokumentacija najdb pa je, kot kaže, sledila stratigrafskim kontekstom (Boschin, Riedel 2000, 74). Pri tem je bil torej idejni pristop do izkopavanj stratigrafski: najdb niso več preurejali po načelih *pravilnosti* in *nepravilnosti;* če so bili določeni elementi v "napačnem" kontekstu, so jim poskušali dati neko razlago, ki ni bila nujno vezana na infiltracijo ali rezidualnost.[30] Videti je obenem, da so upoštevali naravne meje plasti, kar npr. velja za poznomezolitsko plast 3a, ki se jo je od ostalih plasti dalo lepo ločiti (Spataro 1997-1998, 66).

Do podobnega je prišlo tudi v Podmolu pri Kastelcu. Izkopavanja v Podmolu so potekala v času, ko je vsaj v delu slovenske arheologije postajala

[30] Tako so npr. odlomke lončenine v plasti 3a (mezolitski kontekst) interpretirali kot dokaz za uporabo lončenine v poznomezolitskih skupinah (Biagi, Starnini, Voytek 1993, 61), ostanke domačih živali pa kot dokaze za stike med mezolitskimi in neolitskimi populacijami (Boschin, Riedel 2000, 84).



Sl. 4: Profil izkopnega polja v Stenašci (po Biagi, Starnini, Voytek 1993, sl. 2), kjer je bilo mogoče meje poznomezolitske plasti 3a jasno določiti (Spataro 1997-1998, 66).
Fig. 4: Profile of excavated area in Stenašca (from Biagi, Starnini, Voytek 1993, Fig. 2), where it was possible clearly to determine the boundaries of the Late Mesolithic layer 3a (Spataro 1997-1998, 66).

identifikacija stratigrafskih enot oziroma kontekstov ena od osnovnih ciljev arheoloških izkopavanj.[31] Na tem najdišču je metoda izkopavanj še vedno temeljila na izkopu arbitrarnih režnjev naključne debeline, ki so jih pri poznejši obdelavi gradiva korelirali s plastmi, ki so bile dokumentirane v profilih (Turk et al. 1993, 46-47, sl. 7). Zaradi tega vse najdbe nimajo jasnega stratigrafskega konteksta, saj so (predvsem odlomki lončenine ter kameni in koščeni artefakti) predstavljene po skupkih (A-M). Ti skupki, ki se le v grobem pokrivajo s plastmi, so umetni konteksti, ki so jih arheologi v tem primeru na podlagi diagnostičnih najdb skonstruirali zato, ker so menili, da je bilo za izdelavo stratigrafske sekvence najdb *premalo* (ib., 56). Ne preseneča torej, da so v en skupek postavili najdbe iz različnih plasti ali njihovih delov skupaj. Podatkov iz umetnih kontekstov pa, po mojem mnenju, ne gre upoštevati pri poskusu razlage neolitizacijskih procesov. Za ta namen se mi zdijo uporabni ostali podatki, predvsem tisti, ki so jih ugotovili z nepo-srednim jemanjem vzorcev iz identificiranih plasti v profilu (sedimentološke, pedološke in pelodne analize) (ib., 47), ter tisti, katerih stratigarfski kontekst je jasen (glej tudi Budja 1996a).

Na neolitske in/ali mezolitske ostanke so raziskovalci vsekakor naleteli na številnih drugih lokacijah. V teh primerih pa žal gre za izredno skope notice, tako da je opredelitev izkopanin v neolitik ali mezolitik zelo dvomljiva. Ker ti podatki danes še niso preverjeni, lahko le domnevamo, da so raziskovalci naleteli na neolitske in/ali mezolitske ostanke še v jami Grotta Gialla (Benussi 1964; Cannarella 1975-1977, 87-88; Batović 1973, 64), jami Grotta del Bersaglio militare (Cannarella 1975-1977, 92), Jazbini pri Kačičah (Harej 1989, 206), Bestaževci (Saksida, Turk 1988), Jelenci jami (Marchesetti 1879), Jami v Sokolaku (Leben 1959, 242), Pečini v Sapendolu (Leben 1959, 242), Štefakovi pečini (Moser 1899, 117), Tominčevi jami (Battaglia 1960; Leben 1959), Pečini (Moser 1899, 36,117), Golobinki (Grotta Romana presso Sgonico, Cannarella 1975-1977, 85), Kodramovi pečini (Caverna sul monte Vides, Leben 1967, 55; Cannarella 1975-1977, 86), Sirkovi pečini (Caverna a Nord di Santa Croce, Cannarella 1975-1977, 86), Žburlovci (Grotta della Finestra, Moser 1899, 117), Podganji jami (Moser 1910, 378), Žirki pečini (Grotta Tripoli, Leben 1967, 62-63; Cannarella 1975-1977, 70), Jami pri Korinčevih (Leben 1959, 243-244), Pečini pod Medvejkom (Velušček et al. 1998, 103) in Rožicah (Moser 1893, 68). Kaj več o teh najdiščih ne moremo reči, saj tu najdenih ostankov ter njihovih stratigrafskih kontekstov ne poznamo.

Iz povedanega torej sledi, da imajo le redki arheološki podatki iz mezolitskih in neolitskih najdišč na Krasu tak stratigrafski kontekst, znotraj katerega bi lahko opazovali zapise o procesih, ki so pripeljale pretekle skupnosti v novo, neolitsko stanje. Arheološki podatki imajo take kontekste le v jami

[31] Od konca osemdesetih so nekatere arheološke ustanove v Sloveniji, med katerimi predvsem Slovensko arheološko društvo ter Oddelek za arheologijo na Filozofski Fakulteti, začele propagirati metodo stratigrafskega izkopavanja ter pomen arheološke stratigrafije pri interpretaciji arheoloških zapisov. V tem času je bil v slovenščino preveden Harrisov priročnik *Načela arheološke stratigrafije* in objavljeni rezultati raznih s to metodo izkopanih najdišč. Kmalu nato so na *Oddelku za arheologijo Filozofske fakultete* v izobraževalni program vključili cikel večletnih predavanj o arheološki metodologiji, v katerih so bila načela arheološke stratigrafije ena od glavnih tem predavanj.

Mitrej (Staculova izkopavanja), v Stenašci (izkopavanja v devetdesetih) in Jami v Malalanovem dolu, kjer pa je žal arheoloških ostankov izredno malo. Le del arheoloških podatkov iz Podmola pri Kastelcu ima stratigrafski kontekst, ki upravičuje, da te podatke uporabimo pri razlagi neolitizacije. Videti je, da so se med izkopavanji v letih 1958-1963 v Pečini na Leskovcu pri razvrščanju najdb držali stratigrafskih kontekstov (Fabec 2000, 41-43), zato je v tedaj dokumentiranem arheološkem zapisu možno razbrati sledi prehoda v neolitik. Nekatere podatke iz Pejce na Sedlu, Pečine Podkičer, Jame v Zavodu (Cremonesijeva izkopavanja) in iz Stenašče (izkopavanja v sedemdesetih) lahko obravnavamo kot okrnjene vzorce arheoloških zapisov, ki zrcalijo spremembe v grobem in širšem merilu. Morda je skupek arheoloških ostankov iz Pečine pod Steno (le izkopavanja 1992) in jame Lonza (Grotta Benedetto Lonza, le izkopavanja 1980-1982) definiran na podlagi stratigrafskih kontekstov, zaradi česar jih naj ne bi šlo določiti za neuporabne (ib., 43-44). Arheoloških podatkov iz ostalih najdišč zaradi pred tem navedenih razlogov ne moremo upoštevati pri razlaganju procesov prehoda v neolitik; podatkov iz teh najdišč pri svojem pogledu na neolitizacijo Krasa torej ne bom upošteval. O teh bi se morda lahko reklo le, kdaj je v njih človek pustil materialne sledi.

Depoziti v jamah na Krasu: vprašanje uporabe jam

Za razumevanje arheoloških zapisov v jamah, objektih, za katere je značilna zelo kompleksna dinamika naravnih in antropogenih procesov, se mi zdi poznavanje in razumevanje teh procesov pomembno. Arheološke zapise v jamah je možno bolje razumeti predvsem takrat, ko so odgovori na vprašanji *kako so jamski sedimenti nastali* in predvsem *čemu je človek jame uporabljal* vsaj deloma pojasnjeni. Ta pojasnila se mi zdijo relevantna tudi zato, ker opozarjajo na vzroke, zaradi katerih imajo podobne jame, s podobno lego vhoda na dnu vrtače, s podobnim naklonom tal in podobno velikostjo vhoda, lahko popolnoma različne značilnosti v sedimentaciji. Debelina holocenskih plasti v Podmolu pri Kastelcu je na primer znašala kar 7m (Turk et al. 1993), v Podmolu pri Vižovljah (Riparo di Visogliano) pa so pleistocenske plasti ležale tik pod površjem (Cattani et al. 1991). V Katrni pejci so na enem delu jame naleteli na plasti, v katerih so našli mezolitske ostanke, v drugem delu jame, nedaleč od prejšnjega, pa teh plasti ni bilo (Cannarella, Pitti 1978-1981). Takih situacij seveda ne moremo razlagati le kot posledico človekovih posegov v prostoru, čeprav so ti lahko zelo relevantni (npr. Cannarella, Cremonesi 1967, 301-308; Stacul 1982; Radmilli 1978-1981; Cannarella 1975-1977, 88; Gherlizza, Halupca 1988; Turk et al. 1993, 56).

Jamski sedimenti na Krasu

Rezultati geoloških in sedimentoloških raziskav depozitov, ki zapolnjujejo jame na Krasu, še niso ponudili dovolj veljavnih modelov, s katerimi bi jamske sedimente lahko z večjo trdnostjo interpretirali. Videti je vsekakor, da so nastanek, oblika in struktura teh sedimentov zelo lokalno in mikrolokalno pogojeni, tako da bi včasih šlo za prave samosvoje "lokalne zgodovine". Kljub temu je videti, da je danes le mogoče govoriti o tipični (ali idealni) stratigrafski sekvenci[32] jamskih sedimentov (Andreolotti 1969, 83-84; Gospodarič 1980; 1984; 1985; D'Ambrosi, Legnani 1965; Radmilli 1984a).

Iz podrobnih sedimentoloških podatkov predmezolitskih plasti Stenašče (Boschian, Pitti 1984), Katrne pejce (Cannarella, Pitti 1984), jame Lonza (Meluzzi et al. 1984) in Pečine na Leskovcu (Cremonesi et al. 1984)[33] izhaja, da je bilo v teh jamah pod plastmi z mezolitskimi ostanki veliko grušča s kamenjem velikih dimenzij. Gre za elemente, ki so nastajali zaradi mehanskega razpadanja stropa in sten jame, kot posledica delovanja zmrzali. Plasti, v katerih je bilo veliko grušča, prekinjajo plasti sedimentov fine frakcije z redkim kamenjem. Te sedimente tvorijo silikatni minerali in jih je mogoče uvrstiti v skupino pedogeniziranih alohtonih puhlic. Primarno so se odlagali na površju zunaj jam, v jamah pa so se odlagali zaradi delovanja erozije (Cannarella, Pitti 1984, 136; Meluzzi et al. 1984, 119-120; Boschian 1996, 384; 1998, 121).

Značilnosti depozitov,[34] v katerih so našli mezolitske ostanke, so razmeroma dobro znane

[32] Poudarjam, da gre za domnevno tipično sekvenco. Zaradi lokalne pogojenosti jamske sedimentacije bi bilo celo upravičeno dvomiti, ali je iskanje tipične stratigrafske sekvence sploh smotrno.

[33] Na Krasu pozno pleistocenski arheološki zapisi (še) niso bili odkriti. Izjema bi kljub dvomljivi interpretaciji najdb lahko bila le Ozka špilja. Treba je vsekakor opozoriti, da so le v nekaterih jamah testne sonde poglobili tudi pod plastmi z mezolitskimi ostanki (tako na primer v Pečini na Leskovcu, Stenašci in jami Lonza) in da so le v jami Lonza dosegli jamsko dno.

[34] Gre za podatke, ki so bili zbrani v Pečini na Leskovcu (izkopavanja 1958-1966 in 1982), Stenašci (1969-1975 in 1991-1998), Katrni pejci (1975) in jami Lonza (1975-1981, le iz plasti z mezolitskimi ostanki).

(Boschian, Pitti 1984, 144-151; Boschian 1998, 121; Cannarella, Pitti 1984, 131-136; Cremonesi et al. 1984, 21-26; Meluzzi et al. 1984, 112-120). Kaže, da so se glavni procesi, ki so te sedimente oblikovali, le malo razlikovali od tistih iz poznega glaciala. Prisotnost konsistentnega deleža apnenčastih gruščev v zgodnjeholocenskih sedimentih bi tokrat lahko razumeli kot posledico ne več hladne temveč predvsem vlažne klime (Boschian 1996, 384; 1998, 121). Za razliko od starejših sedimentov je zanje še najznačilnejša močna antropogenost kot posledica človekovih aktivnosti v jamah. Poleg silikatnih materialov, ki so v jamo zašli zaradi erozije, so v sedimentih prisotne apnenčaste komponente, ki jih tvorijo mikritni elementi pravilnih oblik in jih gre torej razumeti kot pepele lesnatih rastlin (Boschian 1998, 122; Courty, Wattez 1987). Količina pepelov se v najdiščih močno razlikuje, razlikuje pa se tudi glede na lego znotraj najdišča samega. Poleg tega je v plasteh z mezolitskimi ostanki mogoče opaziti amorfne drobce organskih snovi ter številne pogosto ožgane makroskopske drobce kosti in odbitkov iz rožencev (Boschian 1998, 121-122).

Depoziti z neolitskimi in eneolitskimi ostanki vsebujejo malo silikatnih mineralov, kar pomeni, da ne gre več toliko za alohtone sedimente. Te depozite lahko ločimo na dva tipa. Za prvi tip so značilni navidezno starejši sedimenti, v katerih bolj ali manj gosto in kontinuirano ležijo izmenične bele, črne in svetlorjave, včasih le centimeter debele plasti. Te plasti so lahko horizontalne, v prerezu imajo pogosto obliko loka, tako da spominjajo na prave "kupe" materiala. Delež kalcija v najtanjših frakcijah lahko doseže 60 %, v plasteh pa je mogoče opaziti tudi kalcitne kroglaste kamenčke premera 10 do 30 mm, ki se oblikujejo v tankem črevesu prežvekovalcev (drobnice) in jih živali izločajo v iztrebkih. V plasteh črne barve je veliko drobcev oglja in sledi rastlinskih struktur, ki pretežno pripadajo travam (*Graminaceae*). Omenjene strukture navadno nastopajo v skupkih in jih je možno primerjati z oblikami iztrebkov prežvekovalcev.

Drugi tip depozitov tvorijo homogeni, včasih blatni sedimenti rjavorumenkaste barve z redkim gruščem, ki je kaotično razpršen. Med finimi frakcijami je delež karbonatov 15 do 25 %, večinoma pa jih tvorijo kalcitni kroglasti kamenčki ter zelo številni fitoliti iz hidriranih silicijevih oksidov, ki so anorganski ostanki rastlinskih struktur, npr. trav (*Graminaceae*). Homogenost plasti prekinjajo 1 do 5 cm debele lečaste plasti z ogljem, ki se raztezajo na veliki površini.

Dva tipa depozitov lahko nastopata skupaj, videti pa je, da je prvi tip sedimentov pogosteje v bližini sten, drugi pa je pogost na centralnih delih jame. Sosledja belih-rdečih-rjavih plasti navadno ležijo direktno nad mezolitskimi plastmi in velikokrat na erodirani površini depozita z mezolitskimi najdbami. Zelo verjetno gre te oblike vezati bolj na določene aktivnosti v določenem prostoru in manj kot kronološke indikatorje (Cremonesi et al. 1984, 22; Boschian 1996, 385; 1998, 122).

Na podlagi zgoraj predstavljenih podatkov je G. Boschian (1996; 1998) poskušal vzpostaviti model, ki bi izražal vodilne značilnosti poznoglacialnih ter zgodnje- in srednjeholocenskih procesov, ki so oblikovali jamske depozite. Glavni proces, ki je oblikoval jamske sedimente v poznem glacialu in zgodnjem holocenu (preboreal in boreal), je bila erozija tal, ki so se oblikovala na starejših puhlicah na površju zunaj jam in ki je povzročila odlaganje erodiranih sedimentov v jame. Močna erozija je bila verjetno posledica redke vegetacije (Boschian 1996, 384-385; 1998, 123). V tem časovnem intervalu je zaznavna tendenca po postopnem izboljševanju klime, kar se odraža v manjšanjem vpliva zmrzali v sedimentaciji. Ni sledi hudih mrzlih faz, kar bi lahko bilo posledica vpliva bližajočega se Jadranskega morja.

Značilnost pomezolitskih faz sedimentacije je skorajšnja odsotnost alohtonih detritov, v sedimentih pa nastopa veliko antropogenih elementov. To situacijo gre najbrž vezati na atlantsko fazo rasti gozdov, ki so prekrili pobočja in zmanjšali moč erozije (Boschian 1996, 384-385; 1998, 123).

Na osnovi pedološko sedimentoloških raziskav holocenskih sedimentov Podmola pri Kastelcu je T. Prus (Turk et al. 1993) ponudil nekoliko drugačno razlago nastanka holocenskih sedimentov v Podmolu. Presenetljiva debelina teh sedimentov je po njegovem mnenju posledica dveh dejavnikov. Prvič zaradi močne erozije, ki je v jamo nanašala zemljo, in drugič zaradi antropogenih dejavnikov. Erozijska sila naj ne bi bila voda temveč predvsem veter, ki je v zavetnem delu doline v podmolu ustvarjal prave zemljene "zamete". Tudi njegov model predpostavlja odprtost površin in obenem opozarja na možnost obstoja *primitivnega kmetovanja* (podobnega t. i. *"slash-and-burn"* kmetovanja) že v neolitskih fazah poselitve Podmola, saj plasti z neolitskimi najdbami zavzemajo dobro polovico debeline celotnega holocenskega depozita. Zaradi takega sistema gospodarjenja naj bi namreč kontinuirano nastajale opuščene odprte površine, ki so bile močen vir erozijskega materiala (Turk et al. 1993, 56).

Uporaba jam v mezolitiku in neolitiku

Debati o človekovi uporabi jam v mezolitiku in neolitiku lahko sledimo vzporedno z razpravami

o neolitizaciji Krasa. C. Marchesetti je domneval, da je v prazgodovini človek stalno bival v jamah, morda zato, ker so mu te nudile zaščito pred zvermi in hudim vremenom (Marchesetti 1890). Popolnoma drugače je menil J. Korošec. Po njegovem mnenju jamska najdišča ne izražajo realne poselitve, saj ugotavlja da "... vprašanje stanovanjskih problemov in tudi vprašanje naselbin bo mogoče rešiti šele z najdbami odprtih naselbin na odprtem prostoru ... ne pa v zvezi z jamami, ki so danes še dokaj dvomljive glede na svojo uporabo kot stanovanjski objekti ...". Arheološki zapisi v jamah naj ne bi bili *in situ*, temveč bi jih iz predjamskih prostorov v jame naplavila voda (Korošec 1960, 6-7, 29, op. 13). Podobnega mnenja je bil tudi D. Cannarella, ki je ugotavljal, da v neolitiku jame niso služile kot prava bivališča, temveč so jih ljudje le občasno obiskovali, predvsem kot zasilna zatočišča (Cannarella 1975-1977, 51; 1999, 69), morda pa tudi zaradi kultnih ali funerarnih potreb (Radmilli 1987). Po definiciji naj bi pripadniki skupine *Vlaška* prebivali v takih jamah, ki se odpirajo na dnu že takrat za kmetijstvo obdelanih dolin. To bi bilo dokazljivo predvsem z v začetku prejšnjega stoletja najdenem odtisu z vejami prepletene strukture v Pejci na Doleh (Barfield 1972, 201, ki citira Moserja 1903b). J. Müller na podlagi visokih odstotnih vrednosti ostankov domačih živali v zgodnjeneolitskih jamskih kontekstih na vzhodnem Jadranu domneva, da so jame služile kot pastirske postaje (Müller 1994, 46, 64-69). Izjema bi bila le jama Odmut, v kateri je delež ostankov domačih živali zelo nizek, jamo naj bi torej uporabljali predvsem lovci (ib., 201-203, 327). V obeh primerih bi vsekakor šlo za sezonske tabore potujočih skupin, ki niso bile vezane na poljedelstvo (ib., 62-64). Da so mezolitske skupnosti uporabljale jame kot stalna prebivališča, naj ne bi bilo dvomov (Cannarella 1999, 72).

Poudariti je vsekakor treba, da nobena od navedenih razlag nima trdne osnove. Koroščevo domnevo, da je neolitske ostanke v jame naplavila voda (Korošec 1960, 6-7) in da torej najdbe ne dokazujejo človekove uporabe jam, je danes mogoče zavrniti predvsem na podlagi sedimentoloških in mikromorfoloških analiz sedimentov (Boschian 1998, 122). Težko je verjeti tudi A. M. Radmilliju (1987), saj zapise, ki bi govorili o ritualnih in funerarnih aktivnostih v jamah najdemo le izjemoma in v nejasnih kontekstih (glej tudi Carpani 1999). D. Cannarella gradi svojo domnevo na podlagi "... diskontinuitete v poselitvi", ki pa jo žal ne dokaže, trdi le, da so od neolitika dalje v jame občasno zahajali prebivalci bližnjih naselij na planem, ki pa še niso odkrita (Cannarella 1975-1977, 51). Neutemeljena se mi zdi tudi Barfieldova pojasnitev, saj njegovega glavnega argumenta, povezanega s sledmi konstrukcij v Pejci na Doleh, zaradi vprašljive verodostojnosti Moserjevih izkopavanj, ni mogoče potrditi. Podatkov o morebitnih sledeh konstrukcij v plasteh z mezolitskimi ali neolitskimi najdbami v dostopni literaturi nisem zasledil. Nepotrjena ostaja tudi domneva o poljedelskih aktivnosti na Krasu pred eneolitikom (Budja 1996b, 68). Da so jame v mezolitiku funkcionirale kot stalna prebivališča (Cannarella 1999, 72) je vse manj kot potrjeno. Videti je namreč, da so bile mezolitske skupnosti na severnem Jadranu zelo mobilne (Miracle 1997) in da vsaj del mezolitskih arheoloških zapisov ne govori o permanentni poselitvi jam (Montagnari Kokelj 1984, 226; Biagi, Starnini, Voytek 1993).

Z razliko od omenjenih pojasnitev ima na podatkovni ravni izrazito prednost razlaga, ki jo ponuja Boschian (1996; 1998). Na podlagi sedimentoloških in mikromorfoloških analiz sedimentov je videti, da so mezolitske skupnosti jame intenzivno uporabljale, veliko so v jamah predvsem kurili les (Boschian 1998, 123). Od neolitika dalje je človek jame začel uporabljati predvsem zaradi potreb pastirstva. Značilnosti izmeničnih belih, črnih in svetlorjavih tankih plasti, ki jih srečujemo nad plastmi z mezolitskimi najdbami v številnih jamah na Krasu (Boschian, Pitti 1984, 150), so namreč primerljive z depoziti iz jam na jugu Francije in v jami Arene Candide v Liguriji, ki so jih od srednjega neolitika dalje uporabljali kot začasne staje za črede drobnice in goveda (Courty, Macphail, Wattez 1992). Te jame naj bi pastirji uporabljali v sistemu transhumantne paše skoraj izključno kot hleve, belo-črne plasti pa bi pri tem nastajale zaradi namenskega sežiganja stelje ob koncu njihove uporabe. Bele-rdeče-rjave plasti navadno ležijo v obliki "kupa", možno je torej, da so pastirji večkrat preurejali notranjost jam ter dajali ostanke stelje na kup. Uporabo jam kot staj za živino dodatno potrjuje tudi majhno število ostankov materialne kulture v njih, kar pomeni, da jame v teh primerih ne bi služile v bivalne namene (Boschian 1998, 123-124; 2000).

Boschianovo razlago so v arheologiji sprejeli (Cannarella 1998; 1999; Montagnari Kokelj et al. 1996), na tem mestu pa bi rad opozoril na možnost, da začetek uporabe jam kot staje ni vezan na neolitik. V Stenašci so se tanke bele lečaste karbonatne plasti nad tankimi črnimi progami začele pojavljati že v zgornjem delu mezolitskega depozita (Boschian, Pitti 1984, 150, t. 2a). Na serijo tankih lečastih karbonatnih plasti, ki so jih "podčrtovale" črne proge, so naleteli tudi v zgornjem delu mezolitskega depozita v Pečini na Leskovcu (Cannarella, Cremonesi 1967, 286; Cremonesi et al. 1984, 21-

22, 26, t. 2). Na podobne plasti so v mezolitskem depozitu naleteli tudi v jami Lonza (Meluzzi et al. 1984, 116-118, 120, t. 1). V Katrni pejci so bele lečaste karbonatne plasti nad tankimi črnimi progami prav tako ležale v vrhnjem delu mezolitskega depozita (Cannarella, Pitti 1984, 136). Morda so na podobno situacijo naleteli tudi v Ciganski jami (Marzolini 1971-1972, 99). Ti primeri morda dokazujejo, da so pozne mezolitske skupnosti že uporabljale nekatere jame kot staje.

Vključevanje reje živali v osnovno ekonomijo poznomezolitskih skupnosti potrjujejo tudi arheozoološke študije. V poznomezolitski plasti 3a v Stenašci je delež ostankov drobnice in domačega goveda presenetljivo visok (Boschin, Riedel 2000, 75, 78-84). Drobnica in domače govedo sta zastopana tudi v mezolitskem depozitu Pejce na Sedlu (Riedel 1975, 138-141). Ostanki drobnice so bili v mezolitskem depozitu morda najdeni tudi v Pečini na Leskovcu (Cremonesi et al. 1984, 28-36). V Podmolu pri Kastelcu so v "predneolitski plasti" morda našli ostanke drobnice (Turk et al. 1993, 72; Budja 1996a; Velušček 1997). Ostanki drobnice, domačega goveda in domače svinje so bili morda najdeni tudi v Mali Triglavci (Budja 1996b, 66).

Dodatni argument, ki potrjuje uporabo jam kot staje, lahko vidimo v sicer veliko mlajši tradiciji zidanih konstrukcij, ki ograjujejo vhode jam. Take zidove je npr. v Pejci v Lascu dokumentiral že K. Moser (1899, 55). Primerov, kjer so vhode jam ograjevali zidovi, ne manjka, naj navedem le Cigansko jamo (Marzolini 1971-1972), Škuretovo jamo, Lešo pečino, Katrno pejco, Sirkovo pečino, Jamo na Pavljem vrhu (Gherlizza, Halupca 1988, 52, 57, 59-60, 116, 167) in Podmol pri Kastelcu (Turk et al. 1993, 47). Kdaj je človek te ograde sezidal, z izjemo Pečine pod Muzarji, v kateri so najstarejši zidovi dokumentirani že v pozni prazgodovini (Guacci 1959), ni znano. Vsekakor so v lahko dostopne jame pastirji zapirali črede drobnice še pred kratkim.

Vse jame pa vendar niso služile le kot staje. Na to nas opozarja dejstvo, da so v nekaterih jamah odkrili izredno veliko količino ostankov materialne kulture, kar še posebno velja za Pečino pod Steno (Gilli, Montagnari Kokelj 1993), Pejco v Zavodu (Cannarella, Redivo 1978-1981) in Orehovo pejco (Gilli, Montagnari Kokelj 1992). Zanimivo je, da v nobeni od teh jam niso naleteli na zgoraj omenjene bele-črne-rdeče plasti (Gherlizza, Halupca 1988, 98; Cannarella, Redivo 1978-1981, 47; Legnani 1967).

Nepojasnjeni ostajajo tudi vzroki, zaradi katerih so jame uporabljale mezolitske lovsko-nabiralniške skupine. G. Boschian je dokazal, da so mezolitske skupine jame intenzivno uporabljale, ni pa ponudil pojasnitve razlogov za to (Boschian 1998, 123). Müller domneva, da so jame uporabljali kot lovske postaje (Müller 1994, 65-67). L. R. Binford je glede lovskih uplenitvenih postaj (ang. *kill sites*) ugotovil, da "anatomski deli visoke splošne uporabe so zastopani z nizko pogostostjo, medtem ko so deli nizke uporabe zastopani z visoko pogostostjo" (Binford 1978, 77-81). Da taki zapisi niso le posledica tafonomskih procesov, so pokazale tudi druge študije (npr. Legge, Rowley-Conwy 1988). V jamah na Krasu je količina mezolitskih arheoloških ostankov majhna, med temi pa je veliko ostankov lovnih živali. Pomembno pri teh je, da so med kostnimi ostanki še najbolje zastopane kosti tistih anatomskih delov, ki nimajo veliko mesa oziroma so nizke uporabe, kar je lepo vidno na *sliki 5*.

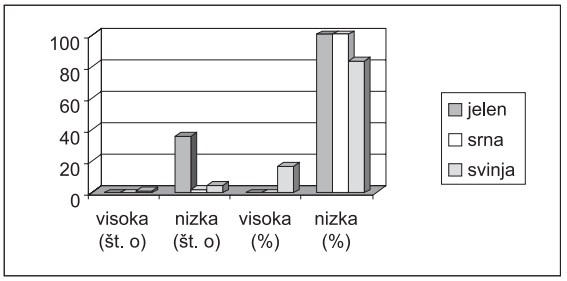
Možno bi bilo torej domnevati, da so mezolitske skupine jame uporabljali kot lovske postaje. Številni ostanki morskih mehkužcev v mezolitskih depozitih te domneve ne spodbijajo, saj je mogoče ta vir prehrane, predvsem zaradi dejstva, da se morski mehkužci lahko ohranijo "sveži" tudi ko so več dni zunaj vode (Ortea 1986), razumeti tudi v sklopu lovskih aktivnosti mobilnih mezolitskih skupin (Miracle 1997, 55).

PALEOKRAJINA KRAS V ČASU ZGODNJEGA IN SREDNJEGA HOLOCENA

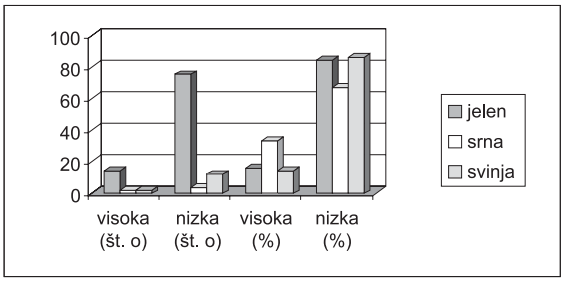
Klima

Klima je spremenljivka, ki včasih subtilneje, včasih pa zelo očitno vpliva na evolucijo krajine in na odnose med ljudmi in okoljem (Mlekuž 2000, 39). Dobrih posrednih klimatskih podatkov in rekonstrukcij paleoklime Krasa še ni na voljo, edini poskusi rekonstrukcij v tej smeri so bili opravljeni na podlagi granulometričnih in strukturnih analiz jamskih sedimentov (Legnani 1967, 80-82; Meluzzi et al. 1984, 119-120). Žal so rezultati teh analiz nizke ločljivosti in so zelo slabo neposredno datirani, saj so jih navadno direktno vezali na "že znana" nihanja hladnih in toplih obdobij v pleistocenu in holocenu ter jih uporabili tudi za datiranje arheoloških in geoloških zapisov. Zato ponujam sliko dinamike paleoklime v nadregionalnem merilu, ki jo povzemam po D. Mlekužu (Mlekuž 2000, 39-45).[35]

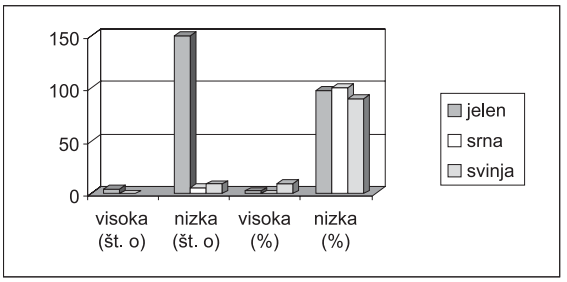
[35] D. Mlekuž je na podlagi podatkov iz lednih zapisov GISP2 (Stuvier, Braziunas, Grootes 1995; Grootes, Stuvier 1997), analiz ravnotežij gladin jezer (Yu, Harrison 1995), dinamike alpskih ledenikov (Röthlisberger et al. 1980; Gamper, Suter 1982; Hormes,



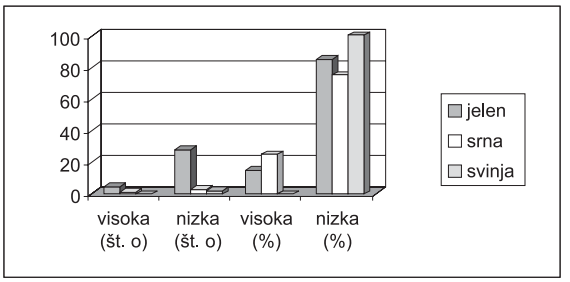
Pejca na Sedlu reženj 3



Pejca na Sedlu reženj 4



Pejca na Sedlu reženj 6



Stenašca plast 3a

Sl. 5: Zastopanost anatomskih delov nizke uporabe (deli lobanje, karpalne/metakarpalne in tarzalne/metatarzalne kosti ter falange) in delov visoke uporabe (vse ostale kosti) jelena (*Cervus elaphus*), srne (*Capreolus capreolus*) in divje svinje (*Sus scrofa*), ki so bili najdeni v 3, 4 in 6 režnju v Pejci na Sedlu (po Riedel 1975, 129-133) in v plasti 3a v Stenašci (po Boschin, Riedel 2000, 86-87). Jelena (*Cervus elaphus*), srno (*Capreolus capreolus*) in divjo svinjo (*Sus scrofa*) sem izbral zato, ker so najbolje zastopane lovne živali v mezolitskih depozitih (Cremonesi 1978-1981, 180; Montagnari Kokelj 1993, 78). Jazbeca (*Meles meles*) nisem upošteval, ker ni še jasno, ali gre ostanke te živali vezati na lovski plen (Bon 1994-1995, 130). Uporaba podatkov le iz Pejce na Sedlu in Stenašce ni naključna. Gre namreč za edina primera, pri katerih so bili izkopani "mezolitski" favnistični ostanki izčrpno analizirani in objavljeni (Riedel 1975; Boschin, Riedel 2000) in ki imajo kolikor toliko jasen stratigrafski kontekst. Podatki iz Stenašce so lahko varljivi, saj je možno domnevati, da so poznomezolitske skupine uporabljale to jamo kot stajo za drobnico in govedo. V vseh vzorcih so anatomski deli visoke splošne uporabe slabo zastopani (na grafih je prikazana številčna in procentualna zastopanost ostankov).

Fig. 5: Appearance of anatomic parts of low use (parts of the skull, carpal/metaccarpal and tarzal/metatarzal bones and falange) and parts of high use (all other bones) of red deer (*Cervus elaphus*), roe deer (*Capreolus capreolus*) and wild boar (*Sus scrofa*), found in spits 3, 4 and 6 in Pejca na Sedlu (from Riedel 1975, 129-133) and in layer 3a in Stenašca (from Boschin, Riedel 2000, 86-87). I chose red deer (*Cervus elaphus*), roe deer (*Capreolus capreolus*) and wild boar (*Sus scrofa*) because they are the best represented game animals in Mesolithic deposits (Cremonesi 1978-1981, 180; Montagnari Kokelj 1993, 78). I have not taken badger (*Meles meles*) into account because it is still not clear whether the remains of these animals are connected with hunted game (Bon 1994-1995, 130). The use of data only from Pejca na Sedlu and Stenašca is not coincidental. These are the only case in which excavated "Mesolithic" fauna remains were exhaustively analysed and published (Riedel 1975; Boschin, Riedel 2000) and have more or less clear stratigraphic context. Data from Stenašca may be deceptive, since it can be assumed that Late Mesolithic groups used this cave as a pen for kine and cattle. In all samples, anatomic parts of high general use are poorly represented (on the graphs are shown numerical and percentage appearance of remains).

Po nagli otoplitvi ob koncu dryasa je sledilo obdobje trenda zmerne otoplitve, ki so ga prekinjale krajše ohladitve, ki se kažejo kot nižanje gozdne meje v Alpah. Otoplitev je trajala do okoli 8900 cal. BP, ko so zabeležena prva znamenja ohladitve, ki se je nadaljevala tja do konca 9. tisočletja BP (8400-8200 cal. BP). To je bil tudi najintenzivnejši ohladitveni dogodek v holocenu. Sledilo je obdobje regionalizacije klime, ko so kratkoročna klimatska nihanja vključevala tudi zelo vlažna leta, z morda več kot 50 % večjimi povprečnimi padavinami od današnjih. V osmem tisočletju je prišlo do ponovne ohladitve, ki je trajala do okoli 7100 cal. BP, ko se je zmanjšala povprečna količina padavin in je zaradi višanja temperatur narasla tudi evapotranspiracija. Med 6000 cal. BP in 5200 cal. BP je bila v Alpah

Schlüchter, Stocker 1998; Nicolussi, Patzel 2000) ter lokalnih klimatskih zapisov z Ljubljanskega barja poskušal rekonstruirati klimo v nadregionalnem merilu, ki bi prikazovala predvsem dolgoročne klimatske ritme. Menim, da bi lahko ta slika vsaj deloma veljala tudi za Kras.

hladna faza, ki ji je sledilo obdobje vedno bolj suhe in tople klime do okoli 4200 cal. BP z nekaj vmesnimi hladnimi dogodki, med katerimi se je najmočnejši zgodil okoli 4600 cal. BC Podatki kažejo, da so bili nekateri dogodki visokih amplitud in so trajali le nekaj desetletij.

Vegetacija

Kras se ne ponaša s številnimi paleovegetacijskimi raziskavami in redke raziskave v tej smeri so dale dokaj skope podatke, ki pa so za temo te naloge pomembni.

Na celotnem Krasu so znane le štiri točke, kjer so bila opravljena vzorčenja paleovegetacijskih zapisov in le del teh je bilo usmerjenih v poskuse rekonstruiranja naravne krajine in ugotavljanja človekovega vpliva na okolje

Ena od teh točk je zamočvirjena kotanja Vodenjak pri Podgorju (Podgorski kras). Tu je vrtina na globini 365 cm dosegla skalno dno. Vzorec iz globine 195 cm je bil radiokarbonsko datiran v čas 2495 ± 100 BP (Z-2543). Približno oceno vegetacije nam dajo le spektri od globine 160 cm navzgor, saj so globlji spektri pelodno izredno revni (Culiberg 1994, 204-205). Zaradi tega in tudi zaradi dvoma, da ta zapis ne seže do obdobja, ki je tema te naloge, nam podatki iz te vrtine bolj malo koristijo.

Leta 1998 je bila pod vodstvom M. Budje (Oddelek za Arheologijo Filozofske Fakultete v Ljubljani) izvrtana vrtina na dnu večje vrtače pri Kozini. Dosežena je bila globina nad 10 m, vendar pa vrtina ni dala zaželenih rezultatov, saj se pelod zaradi presuhih tal ni ohranil (M. Andrič os. inf.).

M. Culiberg je poskušala s palinološkimi podatki iz vrtine v Škocjanskem zatoku pri Kopru rekonstruirati naravno krajino Krasa in ugotoviti človekov vpliv na okolje, njene izsledke pa je v debato o neolitizaciji Krasa vključil Budja (1996b, 67). Pelodni diagram iz te vrtine po njenem mnenju kaže na vegetacijo v časovnem obdobju z začetkom pred okoli 7000 leti. Ugotovila je, da je bila takrat najmočnejša gozdna formacija kvercetalna (*Querco-Carpinetum*), skupaj s črnim gabrom (*Ostrya*) in bukvo (*Fraxinus*). Lipa (*Tilia*) in brest (*Ulmus*) sta bila vseskozi slabše zastopana, vendar stalno prisotna. Občasno nenavadno visoke vrednosti leske (*Corylus*) bi pomenile redčenje gozda za pašnike že od neolitika naprej. V istem času tudi vrednosti hrasta nenavadno močno nihajo, kar bi morda lahko bilo posledica sekanja zelenih vej za zimsko krmo. V neolitskih plasteh je bil najden pelod divje trte (*Vitis*). Prvi pojav peloda žit je dokumentiran v odseku iz časa po polovici četrtega tisočletja, kmetijstvo pa se je intenzivneje razvijalo pozneje, v rimski dobi. V neolitskih in starejših plasteh so močno zastopane lobodnice (*Chenopodiaceae*) (Culiberg 1994, 204, 207). Vprašanje, ki si ga postavljam, je, ali pelodni diagram iz Škocjanskega zatoka res kaže na naravno krajino in antropogene spremembe v nji na Krasu. Zdi se mi namreč verjetneje, da je izvorno področje peloda v teh sedimentih vezano na prostor pod kraškim robom: pelod v tej vrtini pripada večinoma rastlinam, ki so rasle ob rekah in potokih, ki so se izlivali v Škocjanski zatok, torej bolj iz območja pod kraškim robom kot pa Krasa. Drugi problem je tudi sama lokacija vrtine v bližini morja. Če je domneva, da je morje v zgodnjem holocenu prešlo več faz regresij in transgresij realna (Ogorelec et al. 1997), potem bi bilo v primeru mešanja sladke in slane vode v zatoku, izvorno področje peloda mnogo večje, celo zaledje Tržaškega zaliva in porečje vseh rek, ki se vanj stekajo.

Vzorce za paleovegetacijske raziskave so vzeli tudi iz profilov testnih sond v Orehovi pejci, Acijevem spodmolu in Podmolu pri Kastelcu. Za razliko od jezer, kjer se pelod običajno dobro premeša in enakomerno razporedi, je distribucija v jami ulovljenega peloda lahko neuravnotežena in neenakomerna, zaradi česar majhno število preštetih pelodnih zrn iz posameznega vzorca lahko da varljivo vegetacijsko sliko, saj je prisotnost ali odsotnost enega ali dveh pelodnih zrn lahko naključna (Jacobsen, Bradshaw 1980).

V Orehovi pejci so vzorce pobrali po 20 cm globokih intervalih in pri analizi podatkov obravnavali le pelod breze (*Betula*), bora (*Pinus*), smreke (*Picea*), bukve (*Fagus*), leske (*Corylus*) in glavnih komponent mešanega hrastovega gozda (*Quercetum mixtum*, združba hrasta, lipe in bresta). V pleistocenski ilovici ni bilo peloda, verjetno zato, ker je bila takrat jama še zaprta. Njen vhod bi nastal šele z vdorom stropa proti koncu würmske poledenitve. Najstarejši pelodni zapisi govorijo o močni prisotnosti breze in prevladi bora; breza bi se tu ohranjala kot relikt iz poznega glaciala. Majhno število peloda bi lahko bil dokaz za relativno redkost dreves v tem obdobju, in torej za odprto krajino z redkimi gozdovi (subarktični tip gozda). V preborealu delež bora in breze pade, pojavi pa se smreka. Naknadno, v borealu, se ob omenjenih vrstah močno uveljavita bukev in leska, ki v tej fazi dosežeta najvišje mere, medtem ko se že kaže začetek faze mešanega hrastovega gozda. Ta prevladuje v vseh zgornjih vzorcih (atlantik), v katerih se bo v subborealu občasno pojavil še pelod smreke in bukve (Legnani 1967, 83-85).

Vhod jame, ki se odpira na dokaj položnem svetu v smeri proti severu, je bil ob začetku izkopavanj

razmeroma majhen (3.50 x 2.20 m) in verjetno manjši od tistega iz zgodnjega holocena. Kljub temu je bila njegova velikost daleč od tega, da bi omogočala odlaganje regionalnega peloda v jami (glej Mlekuž 2000, 45). Menim torej, da pelodni zapis iz te jame odseva lokalno vegetacijo in torej zmanjšuje vrednost Legnanijevega modela razvoja gozdov na Krasu.[36]

Analize makroskopskih (oglje, semena) in mikroskopskih (pelod) rastlinskih ostankov so bile v Acijevem spodmolu in predvsem Podmolu pri Kastelcu opravljene na osnovi vzorcev, ki so jih pobrali v profilu testne sonde. V času poselitve obeh jam naj bi v okolici jame vseskozi rasel kvercetalni svetel gozd (*Querco Carpinetum*)[37] ter tipično pašniško rastlinje (jerebika, dren, rešeljika ali črni trn) (Turk et al. 1992, 34-35; 1993, 70). Močno je zastopan pelod jelke (*Abies*), ki pa, po mnenju M. Culiberg, ni rasla v bližnji okolici (Turk et al. 1993, 70). Pelod bora (*Pinus*) je v vseh pelodnih diagramih zastopan vsaj s 5 do 10 %, kar naj bi bilo posledica zaraščanja goličav, ki jih je kot pionir zaraščal prav bor. V najnižjih vzorcih (vzorci 31-28), ki so bili pobrani v sedimentih z najstarejšimi neolitskimi ostanki, je pelod bora zastopan z istim deležem kot pelod smreke (*Picea*) in oba prednjačita pred količino peloda jelke (*Abies*). To pelodno razmerje se popolnoma razlikuje od drevesnih razmerij, ki jih kažejo antrakotomski zapisi. Razlogi za to bi bili predvsem tafonomski. Zastopani so hrast (*Quercus*), jesen (*Fraxinus*) in črni gaber (*Ostrya*). Med zelišči je največ peloda pripadalo praprotnim sporam, mnogo manj pa še ščetnicam (*Dipsacaceae*), lobodnicam (*Chenopodiaceae*) in travam (*Graminae*). Ta slika se v teku holocenske sedimentacije depozita v jami bistveno ne spreminja. Pelod žitaric (*Cerealia*) je prvič zastopan šele v plasteh z eneolitskimi ostanki (ib., 70, t. 4).

Na podlagi podatkov iz Acijevega spodmola in predvsem Podmola pri Kastelcu M. Culiberg zaključuje, da ti paleovegetacijski zapisi odsevajo tip vegetacije, ki od samega začetka ni primaren (Turk et al. 1992, 53; 1993, 70). Na to bi kazalo tipično pašniško rastlinje ter izredno majhna količina peloda trav, kar bi lahko bilo posledica intenzivne paše, ki bi onemogočala cvetenje trav. Pelod ščetnic, ki ga je največ v plasteh z arheološkimi ostanki, bi v jamo zašel z iztrebki živine, ki so jo priganjali v vrtačo. Velik delež peloda praprotnatih spor pa bi opozarjal na možnost, da je človek praproti uporabljal za ležišča (Turk et al. 1993, 70-71).

Velikost vrtače, v kateri se odpira Podmol pri Kastelcu, ki ne presega premera 50 m, je majhna, zato pelodni zapis kaže na lokalni vegetacijski razvoj. Ne gre spregledati tudi dejstva, da je prisotnost oglja v stratigrafskem zapisu Podmola vezana na človekove aktivnosti, zelo verjetno na kurjenje lesa v kuriščih. Človek pa je lahko pri uporabi tipa lesa za kurjenje močno selektiven. Sečnja lesa za te namene je navadno lokalna, kvečjemu komaj nadlokalna. Prisotnosti tako različnih drevesnih komponent v zapisu torej ne gre vezati na različne izvorne regije. Problematična se je v zapisu izkazala predvsem prisotnost jelke, za katero bi šlo v tem primeru morda iskati odgovor v legi jame na dnu vrtače, kar bi dajalo tudi drugačne odgovore na visok delež peloda praproti.[38] To kar preseneča, je velika uniformnost vegetacijeskih zapisov skozi ves čas poselitve Podmola, tudi v času, ko so bile nadregionalne klimatske oscilacije zelo močne (Mlekuž 2000, 42-45).

Videti bi torej bilo, da je vegetacija v okolici Podmola in Acijevega spodmola vsaj od neolitika dalje že dosegla stopnjo, ki jo določajo faktorji, ki jih M. Culiberg imenuje "antropozoogeni". Okolico Podmola je prekrival vegetacijski pokrov kvercetalnega svetlega gozda z vmesnimi odprtimi površinami, pašniki in jasami (Turk et al. 1992, 34; 1993, 70-71). Morda so se primeri "hladne" flore ohranili v dolinah, ki so v poglacialu funkcionirale kot vegetacijski refugiji (Poldini 1989, 35). Kaže torej, da je bil tak vegetacijski pokrov, gledano v majhnem merilu, dokaj statičen v času; v paleo-

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[36] Na podlagi teh pelodnih diagramov, ki jih je primerjal z drugimi v sosednjih regijah, je Legnani (1967) poskušal okvirno definirati glavne trende v razvoju klime in drevesnih združb na Krasu. Tako je po njegovem mnenju bor prevladoval v zgodnjem preborealu, ki bi se mu v poznem preborealu pridružila še smreka. V borealu je v razmerju z višanjem temperature, postopoma pojenjala kontinentalna klima. Leska je tedaj dosegla največjo razširjenost. Medtem ko je v furlanski nižini in ob obali prevladoval mešan hrastov gozd, je na kraškem platoju prevladovala bukev. Mešan hrastov gozd je dosegel največjo razširjenost v atlantiku, v času, ki ga označuje tipično poglacialna oceanska klima. V subborealu se je delež bukve in smreke ponovno povečal, kar kaže na premik v bolj kontinentalno klimo. V subatlantiku so se mešan hrastov gozd, bukev in smreka ustalili na različnih višinskih pasovih (Legnani 1967, 87-93).

[37] V tej združbi med drevesi prevladuje gaber (*Carpinus orientalis*), ki zmanjšuje delež črnega gabra (*Ostrya*). Lokalno je zelo močna partecipacija hrasta (*Quercus ilex*) (Poldini 1989, 206-207). V Podmolu so zastopani hrast, jesen, javor, črni gaber in tudi bukev (Turk et al. 1993, 70).

[38] Za vrtače je značilna inverzna stratigrafija vegetacije. Termični gradient vrtač je dvanajstkrat večji od tistega na površju. Ta gradient je povprečna mera, ki se med letom spreminja. Velik pomen te značilnosti nakazuje podatek, da pomeni spust v 50 m globoko vrtačo isto kot vzpon na 600 m visok vrh, ki mu je treba prišteti še nadmorsko višino talne površine (Poldini 1989, 222).

vegetacijskem zapisu iz Podmola in morda tudi Acijevega Spodmola namreč ni zaznati sledi intenzivnih motenj, ki bi povzročale vegetacijsko prestrukturiranost.

Favnistični indikatorji

Ostanke favne so nekateri raziskovalci uporabili pri rekonstrukciji lokalnega in regionalnega okolja in regionalne vegetacije (Cannarella, Cremonesi 1967; Cremonesi 1967; Meluzzi et al. 1984, 122-123; Petrucci 1996; Cannarella 1998). Po teh naj bi v zgodnjem holocenu Kras prekrival hladni tip gozda (prisotnost kozoroga) z jasami (kserofilni mehkužci). Na dnu številnih poglobitev (vrtač) z vodonepropustno rdečo ilovico bi bila stoječa voda ali mlake (prisotnost bobra, vidre, sladkovodnih rib, igrofilnih mehkužcev). Od šestega tisočletja pred našim štetjem naj bi prejšnji gozd zamenjal listnati gozd z jasami (prisotnost jelena in srne ter kserofilnih mehkužcev). Vodna zajetja naj bi se tedaj posušila (delež sladkovodne favne upade), morje pa je doseglo kraški rob (prisotnost morskih mehkužcev, predvsem ogrcev - *Monodonta* in latvic - *Patellae*). Zaradi bližine morja bi se klima kmalu otoplila, prejšnji vegetacijski pokrov bi začel postopoma zamenjevati mediteranski tip vegetacije s številnimi jasami (še vedno prisotnost jelena in srne pa tudi drobnice).

Ta poenostavljena rekonstrukcija paleookolja temelji na favnističnih zapisih, ki večinoma izhajajo iz arheoloških depozitov in so se oblikovali kot posledica kompleksnih tafonomskih procesov (Lyman 1994). Najprej so ti zapisi arheološki zapisi. Direktna uporaba teh podatkov za tako rekonstrukcijo je zato varljiva, predvsem zato, ker so kulturno pogojeni in so torej nereprezentativni glede na celotno favnistično populacijo teritorija. "Uporabo" divjačine so najbrž določala dojemanja kot užitno - neužitno, hranljivo - manj hranljivo, prestižno - neprestižno, vredno - manj vredno itd., kar je vodilo v usmerjeno in selektivno izkoriščanje živali. Iz tega zornega kota je bil izvorni prostor teh "dobrin" lahko nadregionalen in kot tak zrcali zelo varljivo sliko stanja v regionalnem merilu.

Ker v nobenem primeru ne razpolagamo s poglobljenimi tafonomskimi analizami živalskih ostankov, je težko določiti, kateri ostanki so v resnici vezani na potrebe človeka in kateri so v najdišče zašli kot posledica naravnih procesov. Poleg sesalskih, so v tem smislu problematični predvsem malakološki ostanki. Če je ostanke morskih mehkužcev v jamo gotovo prinesel človek, tega ne moremo trditi za ostale, kontinentalne vrste. Ostanki teh vrst bi sicer lahko odsevali paleovegetacijske in paleoklimatske pogoje vhodnega dela jame in njene okolice, žal pa so vodoravne in poševne jame zaradi številnih problemov, ki so vezani predvsem na tafonomske procese, najbolj problematičen tip lokacije za zbiranje malakoloških ostankov (Girod 1996).

Človekovi posegi

Kathy Willis (1995) je pokazala, da so prvi dokazi za kmetovanje na Balkanu in Anatoliji v manjših merilih[39] (krajini) skoraj 3000 C^{14} let kasnejši od zapisov v večjih merilih (najdiščih). Prva večja izsekavanja gozdov, ki se kažejo v povečani kemični in mehanski eroziji, radikalnem upadu drevesnih vrst, večanju deleža zelišč in prisotnosti indikatorjev poljedelstva, so dokumentirana šele po 3000 BP (Willis 1994). Očitno so bili človekovi posegi nizke intenzivnosti, kratkotrajni in omejeni na spreminjanje strukture gozda. Sledi izrabe gozda lovsko-nabiralniških skupnosti so izredno težko berljive, zelo verjetno pa so lovsko-nabiralniške skupnosti posegale v gozd s požiganjem (npr. Willis 1995, 21-22; Mlekuž 2000, 65-67 s citati). Na Krasu še niso odkrili zapisov, ki bi spregovorili o taki ali drugačni izrabi gozda v subsistenčnih aktivnostih lovsko-nabiralniških skupnosti.

Množica modelov, ki razlagajo zgodnjeneolitske posege v gozd, na primer model gozdne paše (Vera 2000) in gozdnega kmetijstva (Carugati, Castelletti, Rottoli 1996), poudarjajo omejenost in kratkotrajnost teh dogodkov, ki so v vegetacijskih zapisih prav tako slabo berljivi. Presenetljivo se torej zdi, da na Krasu opazujemo sledi uporabe gozda in poseganja vanj vsaj od neolitika naprej. Kažejo se predvsem v strukturi vegetacijskega zapisa in jih M. Culiberg razlaga kot posledico intenzivnega pašništva (Turk et al. 1993, 70-71). Tovrstne aktivnosti so se torej verjetno začele pred neolitikom, se potem nadaljevale in očitno postajale vse bolj intenzivne (Poldini 1989), kar potrjujejo tako arheozoološke (Riedel 1975; Boschin, Riedel 2000) kot sedimentološke (Boschian 1996; 1998) raziskave.

Dinamika poselitve kraške planote

Ob bežnem prelistanju tega prispevka postane najprej zelo jasno to, da vsi ali skoraj vsi doslej

[39] V izvennajdiščnih pelodnih in sedimentoloških zapisih (Willis 1995, 19-20).

znani mezolitski in neolitski zapisi izvirajo iz jam. Kakšna sta vrednost in pomen te ugotovitve? Zakaj in kako je prišlo do takega zapisa? Odgovorov je več in vsi so lahko veljavni. Tu pa bi rad opozoril le na nekatere vidike, ki se mi zdijo pri razumevanju neolitizacije zelo pomembni, morda celo ključni. Za boljše razumevanje oblikovanja zapisa poselitvenega vzorca ter njegovega pomena pa moram ponovno opozoriti na zgodovinske okoliščine, v katerih se je ta vzorec odkrivalo.

Intenzivnost prazgodovinskih raziskav, še predvsem tistih o mezolitskih in neolitskih zapisih, je bila, kot sem pokazal, v skladu z njihovimi izvajalci odvisna predvsem od intenzivnosti speleoloških raziskovanj. Do druge svetovne vojne so bile speleološke raziskave osredotočene predvsem na okolico Trsta in so bile le deloma usmerjene tudi v bolj oddaljena področja Krasa. Razlogov za to je bilo več. Jamarsko dejavnost je močno pospešila potreba hitro rastočega mesta Trst po vodnih virih, ki so jih iskali prav v podzemlju (Galli 1999). Zaradi tega je bilo v Trstu za razliko od drugih krajev veliko jamarskih društev, ki so med sabo tekmovala v odkrivanju jam - potencialnih poti do vode. Nenazadnje pa je bilo raziskovanje bolj oddaljenih krajev otežkočeno zaradi pomanjkanja prevoznih sredstev, kar pomeni, da se je raziskovalo predvsem tista območja, ki so bila dosegljiva z javnim prevozom. Po drugi svetovni vojni je bil Kras razbit na različne administrativne enote in takrat se je raziskovalno področje vseh tržaških jamarskih društev skoncentriralo na Tržaški in le deloma Goriški kras. Začelo se je obdobje zelo intenzivnega jamarskega raziskovanja, ki se še nadaljuje in v katerem je bilo odkritih nad 2800 jam, od katerih skoraj 2500 na Tržaškem krasu. Med temi je bilo do leta 1988 evidentiranih kot arheološko najdišče skoraj 130 jam (Gherlizza, Halupca 1988). Goriški kras je bil slabše raziskan kot tržaški, posebno zato, ker se je jamarstvo na Goriškem razvilo šele po drugi vojni in predvsem v zadnjem tridesetletju (Deiuri 1991). Na slovenskem oziroma jugoslovanskem delu Krasa je bilo jamarstvo še manj razvito, neprimerljivo manj je bilo tudi jamarskih društev, ki bi to območje lahko raziskovala. Današnje stanje raziskanosti slovenskega dela Krasa je tako le za malenkost boljše od tistega ob koncu vojne. Na vsaj dvakrat večjem teritoriju od tržaškega je bilo odkritih manj kot 600 jam. Intenzivnost in tudi kvaliteta raziskav[40] je bila (in je) na obeh straneh meje neprimerljiva (Malečkar, Morel 1984; Šušteršič 1994), kar je mogoče razbrati tudi iz slike 1. Rezultat tega kvalitativnega dualizma se jasno zrcali v mezolitskem in neolitskem poselitvenem vzorcu. Videti je, kot da je bil takrat intenzivno izkoriščan le obalni del Krasa, kot da v notranjost, predvsem tostran slovenske meje, takratne skupnosti ne bi zahajale. Tak poselitveni vzorec zrcali sodobne družbene in geopolitične trende in ne dinamik mezolitske in neolitske poselitve.

Rekel sem, da je bil Tržaški kras intenzivno raziskan. Zato menim, da bi bil poselitveni vzorec s tega območja lahko reprezentativen, kljub temu da ga je najbrž pogojevala lokalna geomorfološka situacija, ki se deloma razlikuje od tistih na drugih delih Krasa.

Poselitev v jamah in naselja na planem

Ob številnih priložnostih (npr. Montagnari Kokelj 1993; Bagolini, Bressan 1994, 67; Budja 1996b; Biagi, Starnini 1997-1998;) je bilo rečeno, da so mezolitski in neolitski zapisi na Krasu vezani izključno na jame. Podatki naj bi bili parcialni, ker naj ne bi izhajali tudi z najdišč na prostem, ki naj bi bila "... gotovo komplementarna jamam v mezolitiku in morda še pomembnejša v kasnejšem neolitiku" (Montagnari Kokelj 1993, 76).

Te ugotovitve izgubijo del svoje trdnosti, če se obravnava nekatera najdišča kot najdišča na odprtem. V tako kategorijo bi lahko spadala lokacija Podmol pri Repentabru, kjer se arheološke plasti nizajo na dnu vrtače ob vznožju previsne stene. Arheološki zapisi v tem najdišču kažejo, da so se na lokaciji zadrževale neolitske in morda tudi mezolitske skupine (Radmilli 1973-1974a; Montagnari Kokelj 1993, 79). Poselitev podobne lokacije je zabeležena tudi v bližini Nabrežine (Previs na Caharijevem Svetu, Riparo Zaccaria), kjer so prav tako ob vznožju previsne stene na dnu doline odkrili mezolitske zapise. Ta lokacija je bila tako kot Podmol pri Repentabru poseljena tudi v obdobjih, ki so sledila mezolitiku (Calza, Cannarella, Flego 1973-1974; Montagnari Kokelj 1993, 79; Cannarella 1978, 32; Stanislav Flego, os. inf.). Mezolitske zapise so na odprtem odkrili v bližini Doberdobskega jezera (Lago di Doberdò, Cannarella 1978, 20), morda bi v to skupino najdišč lahko postavili tudi lokacijo pri Rožicah (Kozina), kjer so proti koncu 19. stoletja

[40] To velja tako za speleološka kot za arheološka raziskovanja. Kot povedano, intenzivnost arheoloških raziskav je bila vezana predvsem na skupin amaterjev arheologije v sklopu jamarskih društev, ki jih je bilo na Goriškem in Slovenskem krasu neprimerno manj kot v Trstu.

ob nekem kalu našli veliko "kamenodobnih" kamenih artefaktov (Moser 1893, 68). Odločitev za poselitev v teh primerih niso pogojevale jame, kljub temu pa lahko opazujemo zvezo med zapisi v jamah in najdišči na odprtem.

Kaj na Krasu razlikuje zapise v jamah od tistih na prostem? Ali je na interpretativni ravni upravičeno ločevati tip poselitve na jamsko in plano? Glede na trajnost in intenzivnost poselitve ene točke bi se lahko razločevalo dva tipa poselitve neke lokacije: stalno (recimo naselbina) in nestalno (recimo tabor). Oba označujeta močne interpretativne implikacije glede razumevanja neolitizacije (za ta prostor npr. Chapman, Müller 1990; Müller 1994), obstoj obeh pa je lahko možen tako na odprtem kot v sklopu jame (na primer Predjamski grad pri Postojni). Ključno vprašanje torej ni vezano na mikrogeomorfološko lego zapisov, kjer se včasih le s težavo odločimo, ali gre za zapise v jami ali pred jamo oziroma za zapise v odnosu z oblikami, ki jih le s težavo opredelimo kot jama ali ne-jama, temveč na različne strategije uporabe lokacij v prostoru. Do danes še nimamo trdnih dokazov, s katerimi bi lahko kateri koli mezolitski ali neolitski zapis na Krasu razlagali s stalno ali sezonsko uporabo lokacije.[41] Kljub temu so bili arheološki zapisi, navadno zaradi njihove strukture, v mezolitskih in neolitskih najdiščih pretežno obravnavani kot zapisi intenzivnih kratkotrajnih poselitev (Cannarella 1968, 163-165; 1975-1977, 51) in epizod (Montagnari Kokelj et al. 1996, 229), kar danes potrjujejo tudi sedimentološke raziskave (Boschian 1998). Na Krasu je gledano v večjem merilu struktura mezolitskih in neolitskih zapisov iz postaj v jamah in na odprtem dokaj podobna[42] (Montagnari Kokelj 1996; Calza, Cannarella, Flego 1973-1973) in bi v obeh primerih govorila bolj o logističnem (ang. *logistical*) kot rezidenčnem (ang. *residential;* Binford 1982, 7-8) značaju strategij izrabe prostora.[43]

Osnovno gospodarstvo in mobilnost[44]

Osnovno gospodarstvo mezolitskih skupnosti na Krasu je bil lov na divje živali,[45] med katerimi je zastopan predvsem jelen (*Cervus elaphus*), nekoliko manj pa tudi srna (*Capreolus capreolus*) in divja svinja (*Sus scrofa*) (Cannarella, Cremonesi 1967; Riedel 1978-1981, 211; Cannarella 1978; 1998; Cremonesi, Pitti, Radmilli 1984a, 232-233; Montagnari Kokelj 1993, 78). Zastopanost drugih sesalcev je v zgodnjemezolitskih plasteh veliko manjša, med lovne živali bi morda sodili še jazbec (*Meles meles*), govedo (*Bos sp.*), bober (*Castor fiber*), lisica (*Vulpes vulpes*), kuna belica (*Martes foina*), kuna zlatica (*Martes martes*), divja mačka (*Felis silvestris*), alpski kozorog (*Capra ibex*), poljski zajec (*Lepus europaeus*), vidra (*Lutra lutra*), los (*Alces alces*), volk (*Canis lupus*) in medved (*Ursus sp.*) (Cannarella, Cremonesi 1967, 289; Riedel 1975; Cremonesi 1984, 106; Montagnari Kokelj 1984, 211-212). Številni ostanki rib v zgodnjemezolitskih plasteh opozarjajo, da je pomembno vlogo imel tudi ribolov (Cannarella, Cremonesi 1967, 289; Meluzzi et al. 1984, 121). Ribji ostanki pripadajo rdečeperki (*Scardinus erythrophthalmus*), ščuki (*Esox lucius*), linju (*Tinca tinca*), krapu (*Cyprinus carpio*), podusti (*Chondrostoma nasus*) (Cremonesi et al. 1984), mreni (*Barbus barbus*) in oradi (*Sparus aurata*). Razširjena sta bili tudi lov močvirske sklednice (*Emys orbicularis*) in nabiranje kontinentalnih mehkužcev, predvsem velikega vrtnega polža (*Helix pomatia*). V manjši meri so nabirali tudi morske mehkužce, med katerimi so zastopani členkasti ogrc (*Monodonta articulata*), navadne ostrige (*Ostrea edulis*) in klapavice (*Mitilus sp.*) (Cannarella, Cremonesi 1967, 289; Cremonesi 1984, 106; Meluzzi et al. 1984, 121-122; Boschian, Pitti 1984, 152; Montagnari Kokelj 1984, 211-212).

Lov na večje sesalce (jelen, srna, divja svinja)

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[41] Take dokaze bi lahko na primer nudile arheozoološke študije o času smrti živali (Monks 1981). Arheozoološki podatki se dotikajo številnih tem o človekovih aktivnostih in strategijah v različnih merilih. Ponujajo odgovore na vprašanja o aktivnostih različnih ljudi ali kategorij ljudi na določeni lokaciji, o razlogih za spremembe v subsistenčnih strategijah, o pojavu in/ali sprejemanju pridelovalnega gospodarstva itd. (Reitz, Wing 1999).

[42] Podobna je struktura favnističnih ostankov, orodij, izdelkov ter tip stratigrafskih enot.

[43] Na to bi kazala predvsem majhna gostota arheoloških ostankov, med katerimi pa je veliko ostankov lovnih živali. Pomembno pri teh je, kot sem pred tem že pokazal, da so med kostnimi ostanki še najbolje zastopane kosti tistih anatomskih delov, ki so nizke uporabnosti.

[44] Poudarjam, da pri tem in v naslednjih poglavjih uporabljam le tiste podatke, ki imajo kolikor toliko znan in veljaven stratigarfski kontekst. Upoštevam torej podatke iz jame Mitrej (Stacul 1971-1972; Steffè de Piero 1978b), Stenašce (Boschian, Pitti 1984; Biagi, Starnini, Voytek 1993; Boschin, Riedel 2000), Jame v Malalanovem dolu (Maselli Scotti 1981-1982), Podmola pri Kastelcu (Turk et al. 1993), Pečine na Leskovcu (Cannarella, Cremonesi 1967), Pejce na Sedlu (Andreolotti, Gerdol 1972; Riedel 1975), Pečine Podkičer (Montagnari 1981-1982; Montagnari Kokelj 1984), Jame v Zavodu (Cremonesi 1984) ter iz jame Lonza (Meluzzi et al. 1984).

[45] Opozoriti je treba, da temelji slika osnovnega gospodarstva le na arheozooloških virih, saj doslej še ne razpolagamo z arheobotaničnimi podatki.

se je kot osnovna lovna aktivnost obdržal tudi v poznem mezolitiku (Cannarella, Cremonesi 1967; Riedel 1978-1981, 211; Cannarella 1978; 1998; Cremonesi, Pitti, Radmilli 1984a, 232-233; Montagnari Kokelj 1993, 78). Z nizko zastopanostjo ostajajo prisotni tudi drugi zgoraj omenjeni sesalci, izjema sta le los (*Alces alces*) in vidra (*Lutra lutra*), morda pa tudi bober (*Castor fiber*), saj njihovih ostankov v poznomezolitskih plasteh še niso odkrili (Boschian, Pitti 1984, 153; Cannarella, Cremonesi 1967, 289; Cremonesi 1984, 106; Cremonesi et al. 1984, 34-35). Kaže, da je v poznem mezolitiku imelo pomembno vlogo nabiranje morskih mehkužcev, ki v tem času doseže "skoraj eksplozivne vrednosti" (Boschian, Pitti 1984, 153). Nabirali so predvsem kotače (*Trochidae*), latvice (*Patellae*) in ogrce (*Monodontae*), v manjši meri pa tudi ostrige (*Ostreae*) in klapavice (*Mitili*) (Cremonesi 1967, 13; Cremonesi 1984, 105-106; Boschian, Pitti 1984, 152-153; Meluzzi et al. 1984, 122-123; Boschin, Riedel 2000, 83). Ribolov se obdrži, čeprav v veliko manjši meri (Cannarella, Cremonesi 1967, 289-290, 322-324), zastopana sta le orada (*Sparus aurata*) in glavoč (*Gobius sp.*) (Riedel 1975, 142; Boschian, Pitti 1994, 153). V poznem mezolitiku se je ob lovu in nabiralništvu postopoma pojavljala tudi reja domačih živali, med katerimi predvsem drobnice (*Ovis vel capra*) in v manjši meri goveda (*Bos taurus*), morda pa tudi svinje (*Sus scrofa*) (Riedel 1975, 138-141; Turk et al. 1993, 72; Boschin, Riedel 2000, 83; Budja 1996a).

V zgodnjem neolitiku je primarno vlogo lova zamenjala reja drobnice (Steffè de Piero 1978b; Boschin, Riedel 2000, 78-83), ki so jo gojili predvsem zaradi mesa in v manjši meri tudi zaradi mleka, niso pa je izkoriščali za pridelavo volne (Boschin, Riedel 2000, 78-80). Prisotna je, čeprav v manjši meri, tudi reja goveda in svinj. Zmanjša se pomen lova, ki se ohrani, spekter lovnih živali pa se glede na prejšnje obdobje bistveno ne spremeni (ib., t. 2). Ohrani se tudi intenzivno nabiranje morskih mehkužcev (Steffè de Piero 1978b).

Mobilnost

Lupine morskih mehkužcev iz zgodnjemezolitskih plasti v jamah na Krasu kažejo, da so imeli ljudje, ki so te lokacije uporabljali, stike z obalo. Ostanki sladkovodnih rib in dvoživk, sesalcev, ki so vezani na sladkovodne tokove, ter favne, ki živi v brakičnem okolju, govorijo, da je bila mobilnost skupin, ki so se v zgodnjem holocenu zadrževale na kraški planoti, vezana tudi na oddaljena območja v okolici kraške planote.[46] Za te skupine je obenem značilno, da so nabirale predvsem kopenske mehkužce (Cannarella, Cremonesi 1967; Meluzzi et al. 1984; Cremonesi, Pitti, Radmilli 1984a). Zelo verjetno jih niso nabirali v od taborov oddaljenih krajih; številni ostanki tega vira prehrane morda opozarjajo na intenzivnejšo uporabo bližnje okolice najdišč oziroma na to, da so se skupine dlje zadrževale na območju najdišča (Miracle 1997, 55). Intenzivno nabiranje kopenskih mehkužcev lahko povzroči njihovo izčrpanje, zato so morale skupine nabiralcev, ki so izkoriščale ta vir, premikati svoje bazne tabore dokaj pogosto in tako omogočiti, da si populacija mehkužcev opomore (Lubell et al. 1976; Kelley 1995).

Intenzivnost izkoriščanja virov iz različnih ekoloških enot se pri poznih lovsko-nabiralniških skupnostih močno zmanjša, kar lahko razumemo tudi kot zmanjšanje mobilnosti na dolge razdalje. Favnistični ostanki iz poznomezolitskih plasti so namreč vezani le na vrste, ki živijo na obalnem pasu morja ter v odprtih gozdovih.[47] V pozno mezolitskih kontekstih so ostanki kopenskih mehkužcev izredno redki (Cremonesi, Pitti, Radmilli 1984a, 232), medtem ko drastično naraste število ostankov morskih mehkužcev (Boschian, Pitti 1984, 153, 170) in se obdrži tudi v zgodnjem neolitiku, pozneje pa postopoma izgublja pomen med subsistenčnimi aktivnostmi (Steffè de Piero 1978b). Opazimo, da je porast pogostosti ostankov morskih mehkužcev zabeležen hitro potem, ko se je morje zaradi poglacialne transgresije približalo kraškemu robu in ga morda v določenih predelih tudi doseglo (Radmilli 1963; Cannarella, Cremonesi 1967, 326-328; Radmilli 1984a; Ogorelec et al. 1997). Poleg ostankov morskih mehkužcev so v istih kontekstih zastopane le vrste, ki so vezane na bolj ali manj odprto vegetacijo. Izredno povečanje zastopanosti ostankov morskih virov (Boschian, Pitti 1984, 153) bi lahko označevalo povečanje rednih stikov ljudi

[46] Ostanki lovnih živali, ki so jih našli v Pečini na Leskovcu (Cannarella, Cremonesi 1967, 287-290), Jami Lonza (Meluzzi et al. 1984, 121-123), Jami v Zavodu (Cremonesi 1984, 106) in Stenašci (Boschian, Pitti 1984, 152-153), kažejo, do so bile aktivnosti zgodnjeholocenskih lovcev vezane na zelo različne habitate: odprt tip gozda (predvsem jelen - *Cervus elaphus*); stoječe in počasi tekoče vode (močvirska sklednica - *Emys orbicularis*, rdečeperka - *Scardinus erythrophthalmu*, ščuka - *Esox lucius*, linj - *Tinca tinca*, krap - *Caprinus carpio*); srednji tok alpskih rek (podust - *Chondrostoma nasus*, mrena - *Barbus barbus*); brakične vode (orada - *Sparus aurata*); morska voda (morski mehkužci) (Kryštufek 1991; Milišić 1991; Povž, Sket 1990).

[47] To je lepo vidno v poznomezolitskih kontekstih v Stenašci (Boschian, Pitti 1984, 153), kjer ostanki pripadajo oradi (*Sparus aurata*) - brakične vode, glavoču (*Gobius sp.*) in morskim mehkužcem - slana voda ter predvsem jelenu (*Cervus elaphus*) - odprti gozdovi.

z obalo, torej predvsem povečano intenzivnost premikov med obalo in notranjostjo v bolj sedentarnem sistemu mobilnosti (podobne strategije je od poznega pleistocena in v zgodnjem holocenu v Istri ugotavljal Miracle 1997).

Ostanki morskih mehkužcev so pripadali vrstam, ki so jih lahko uporabljali za hrano (*Patellae*, *Mytili*, *Monodonta*, *Ostreae*), kot ornament (*Columbella rustica* in *Hinia reticulata*) ali oboje (*Tectonatica affinis operculata*). Ti mehkužci živijo na skalnatih podlagah na litoralnem območju ter se navadno zadržujejo v pasu, kjer se izmenjujeta plima in oseka in predvsem v bližini dotokov sladke vode[48] (Milišić 1991). Danes so v Tržaškem zalivu pogosti na obali pod kraško planoto ter na vzhodni obali zaliva.

V času ko so ljudje intenzivno izkoriščali morske mehkužce, morje še ni v celoti doseglo kraškega roba, morda so se nad vodo na nekaterih območjih še dvigali manjši otoki[49] (Boschian, Montagnari Kokelj 1984), kljub temu pa je mogoče domnevati, da je bilo morje tedaj zelo blizu današnji obali (Marocco 1989; 1991; Ogorelec et al. 1997). Ob vznožju kraške planote so bili verjetno stalni in presihajoči sladkovodni izviri (Accerboni, Mosetti 1967; Galli 1999, 99-103), zaradi katerih bi lahko domnevali obstoj sladkovodnih močvirij. Obstoj enega v zgodnjem holocenu je dokazan na vzhodnem delu Tržaškega zaliva (Ogorelec et al. 1981).

Teža morskih mehkužcev ter njihova hranljivost je večja v toplih mesecih, zaradi česar je P. Miracle menil, da je bil čas nabiranja morskih mehkužcev pogojen sezonsko (Miracle 1997, 54-55). V toplejših mesecih bi bil obenem vložek energije za njihovo nabiranje manjši, saj se morski mehkužci v hladnih mesecih zadržujejo v globljih vodah. Isto velja tudi za ostalo morsko favno. Intenzivno obiskovanje ljudi in živali kraškega vznožja ob morski obali bi lahko predvsem v poletnih, sušnih mesecih pogojevali tamkajšnji viri sladke vode. Priložnosti srečanja s plenom bi bile torej tedaj večje. Poleg tega se, gledano v večjem merilu, obalni pas izkaže kot močan ekoton med dvema krpama (ang. *patch*, pojem, ki se v krajinski ekologiji uporablja za prostorske manifestacije različnih ekosistemov; Farina 1998, 105-111, Mlekuž 2000, 11-13), v manjšem pa kot kompleksen mozaik krp (morja, gozda, jas, sladkovodnih površin itd.) z mrežo ekotonov. Ekotoni so robovi med krpami; zanje je značilna prisotnost vrst iz obeh krp, ki se stikata, in vrst, ki žive na robovih, kar prispeva k njihovi veliki produktivnosti[50] (Mlekuž 2000, 12). Glede na prostor, ki ga obravnavam, je torej obalni pas prostor z največjo "ponudbo" (ang. *affordance*; ib., 7, s citati). Morda so se pozne lovsko-nabiralniške skupnosti na tem območju zadrževale dalj časa, morda so tu imele sezonske in/ali rezidenčne tabore (ang. *residential camp*; Binford 1982, 7-8). Izkoriščanje virov v notranjosti, na kraški planoti, bi bilo vezano bolj na logistični tip mobilnosti znotraj logističnega radija (ang. *logistic radius*; Binford 1982, 7-8), ki bi vključeval predvsem območja na kraški planoti, z vzpostavitvijo postaj oziroma zbirališč (ang. *gatherings*) v sklopu mreže poti na planoti.

Začetek in postopno intenziviranje izkoriščanja domačih živali, predvsem drobnice od poznega mezolitika dalje ni povzročilo drastičnega prestrukturiranja subsistenčnih sistemov lovsko-nabiralniških skupin. Intenzivni premiki med obalo in notranjostjo so se naprej obdržali tudi v neolitiku (Steffè de Piero 1978b). Obdržijo se tudi stara zbirališča in stare poti, vedno bolj pa se izkorišča prostor na kraški planoti. Število zbirališč se tu postopoma poveča (glej *sl. 1*), njihova vloga v subsistenčnem sistemu je vedno manj vezana na pretežno lovske in vedno bolj na pretežno pastirske potrebe.

Intenziviranje izkoriščanja virov na kraški planoti bi bilo mogoče razlagati kot posledico popolnega ali skoraj popolnega morskega zalitja območja pod kraškim robom. Številčnost ekotonov se je s tem bistveno zmanjšala, morje je zalilo vsaj del sladkovodnih virov, zmanjšala se je ponudba. Morda je to povzročilo tudi opustitev rezidenčnih taborov ob vznožju Krasa in postavitev novih na bolj "varnih" območjih. Vedno bolj intenzivno pašništvo na kraški planoti je povzročilo prestrukturiranje vegetacije ter pripomoglo k odpiranju površin (Turk et al. 1993, 70). Zaradi tega se je ponudba tu večala, nove priložnosti je dajala možnost vključitve v sisteme trgovine na dolgo razdaljo. Predvsem od neolitika dalje, morda pa tudi pred tem (Budja 1993, op. 14), se namreč začenjajo intenzivni kontakti na dolgo razdaljo, ki se kažejo v uporabi eksotičnih materialov in prestižnih predmetov.[51]

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[48] V Pečini na Leskovcu so v poznomezolitskih depozitih našli tudi ostanke ravne nožnice (Solen marginatus). Ta živi v plitvih litoralnih vodah zakopana v mehkem peščenim in muljastem dnu v neposredni bližini rečnih ustij (Milišić 1991, 84). Danes jo najdemo le na obalah zahodno od Timave ter ob ustjih rek.

[49] Manjši otok je bil v Tržaškem zalivu viden še v zgodovinskem obdobju (Calligaris 1999, 23).

[50] Tak je na primer pas brakične vode.

[51] Videti je, da uporabo lokalnega kremena zamenja uporaba nelokalnega, verjetno predvsem lesinskega (z območja Monti Lessini v Italiji) zelo kvalitetnega kremena. Pojavijo se tudi artefakti iz obsidiana ter sekirice iz glajene zelene kamnine. Morda bi šlo to spremembo

Do sprememb v mobilnosti, predvsem v negativno smer, je morda prišlo ob koncu neolitika, v eneolitiku. Videti je namreč, da so skupine na Krasu šele od tedaj začenjale izkoriščati udomačene rastline in obdelovati zemljo[52] (Turk et al. 1993, 70), kar je skoraj gotovo spodbudilo k večji sedentarnosti.

ZAKLJUČEK

Neolitizacija Krasa je proces, ki sega v zgodnji holocen.[53] Poglacialne spremembe, predvsem širitev gozda, so prestrukturirale tudi distribucijo in gostoto živalskih vrst (Evans 1975; Rowley-Conwey 1986). Na Krasu so se razširile teritorialne vrste, katerih optimalni habitat je ekoton med gozdom in odprtimi površinami (predvsem jelen - *Cervus elaphus*). Zgodnjeholocenske lovsko-nabiralniške skupnosti so bile zelo mobilne in so izkoriščale vire na širokem teritoriju. Prostor gibanja je zaobjemal kraško planoto, poplavne ravnice z velikimi vodnimi tokovi (Soča, Vipava) ter močvirnato (Ogorelec et al. 1981) ravnico na območju današnjega Tržaškega zaliva, ki se je zaradi morske transgresije vedno bolj krčila. Morda so te skupnosti izkoriščale vire predvsem v nabiralniškem radiju (ang. *foraging radius*; Binford 1982, 7-8) v okolici residentalnega tabora in preprečevale izčrpavanje virov z relociranjem baznih taborov na bolj ali manj oddaljene prostore.[54]

Na prehodu v srednji holocen se je morda tudi zaradi močnega zmanjševanja prostora gibanja zaradi dviga morske gladine spremenil vzorec mobilnosti. Morda so se začeli razvijati sistemi logistične mobilnosti z vzpostavitvijo baznih prostorov znotraj logističnega radija, ki je vključeval le pas morske obale in kraško planoto. Spekter lovnih živali se je namreč zožil, v jamah niso več zastopane živali, ki so vezane na sladko vodo (sladkovodne ribe, vidra, močvirska sklednica, itd.), drastično pa je narasla intenzivnost izkoriščanja morskih virov (Boschian, Pitti 1984, 153). Intenziviranje aktivnosti na manjšem gospodarskem prostoru je skupaj z verjetnimi stiki, predvsem z novimi bližjimi skupnostmi kmetovalcev v Furlaniji, morda pa tudi v Istri (Petrucci, Riedel 1999, 29-30), spodbudilo postopno vključevanje domačih živali v subsistenčno ekonomijo zadnjih lovsko-nabiralniških skupin,[55] ki so v novem viru najbrž videle še eno priložnost za razširitev spektra virov in povečanje ekonomske varnosti (Whittle 1996, 36-37). Vključevanje udomačenih živali lahko v tej perspektivi vidimo kot dodatno ekonomsko strategijo z "zakasnelim vračanjem" (ang. *delayed return*), podobno kot shranjevanje, sušenje in konzerviranje (Woodburn 1980). Izkoriščanje novega vira je bilo kompatibilno s starim, mobilnim načinom življenja in ni povzročilo prestrukturiranja strategij v izrabi prostora[56]. Jame so znotraj mobilnega sistema izrabe prostora vse bolj začenjale funkcionirati tudi kot staje, v katere so sedaj pastirsko-lovsko-nabiralniške skupine zapirale svoje črede drobnice in goveda (Boschin, Riedel 2000). Te skupine so začenjale tudi uporabljati lončenino (Biagi, Starnini, Voytek 1993, 61), ki so jo najbrž prevzele preko stikov z zgoraj omenjenimi močnimi skupnostmi kmetovalcev v Furlaniji ali, kar pa je maj verjetno, v Istri (Spataro 1997-1998).

Od polovice sedmega tisočletja uncal. BP je pastirsko-lovsko-nabiralniško gospodarstvo skupin na Krasu, ki je slonelo predvsem na reji živine in še najbolj drobnice, postalo ustaljen način življenja (Boschin, Riedel 2000). Morda so bili rezidenčni tabori zaradi dviga morske gladine in dokončnega zalitja "tržaške" ravnice premaknjeni na kraško planoto, ki je zaradi "odpiranja" vegetacije (Turk et al. 1993, 70-71) postajala bolj privlačna, saj so se večale priložnosti za ponudbo na tem območju. Sistem mobilnosti se s temi spremembami ni bistveno spremenil, intenzivni kontakti med obalo in kraško planoto so se nadaljevali (Steffè de Piero 1978b). Skupnosti so se začele vključevati v sistem trgovine na dolge razdalje, kar na Krasu, podobno kot v severnoitalskih kmetovalskih skupnostih, najbolje dokazuje obtok alohtonega kremena in glajenih kamenih orodij (Ferrari, Mazzieri 1999; Pessina

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vezati na vključitev Krasa v sistem intenzivne trgovine, ki se je od polovice sedmega tisočletja uncal. BP razvila na severnem apeninskem območju, na katerega so bila močno vezana naselja neolitskih kmetovalcev v sosednji Furlaniji (Pessina, Muscio 1999).

[52] Sledi uporabe na nekaterih kamenih orodjih (na primer v predeneolitskem stratumskem kontekstu v Orehovi pejci) sicer nakazujejo, da so bila ta orodja uporabljena za rezanje rastlin. Ti elementi pa še ne dokazujejo predeneolitskega kmetovanja. Najprej zato, ker ni nujno, da so jih uporabljali za žetev. Poleg tega ne gre spregledati dejstva, da so vsa ta orodja opredeljena z nazanesljivimi konteksti.

[53] Dokazi za človeško prisotnost na Krasu v pleistocenu so redki, popolnoma pa manjkajo zapisi iz poznega glaciala (Broglio 1994).

[54] Intenzivno izkoriščanje kopenskih polžev s strani zgodnjeholocenskih skupin bi lahko govorilo prav o takih strategijah mobilnosti (Lubell et al. 1976; Miracle 1997, 55).

[55] Sicer bi ostanki domačih živali v Pejci na Sedlu (Riedel 1975, 138-141), ki jih časovno zamejujeta radiokarbonski dataciji 7620 ± 150 BP in 7050 ± 60 BP (Biagi 1994, 60), lahko opozarjali na možnost, da so se prve domače živali pri lovcih-nabiralcih pojavile bolj zaradi družbenih kot pa gospodarskih razlogov (Zvelebil 1994, 135; Sherratt 1982, 23).

[56] Podobno lahko interpretiramo zapise na Ljubljanskem barju (Mlekuž 2000, 68-77).

1999; Montagnari Kokelj 1993, 81). O kontaktih med prvimi skupnostmi kmetovalcev v Padski nižini, na vzhodnem Jadranu in pastirsko-lovsko-nabiralniškimi skupnostmi na Krasu govori tudi kroženje lončenine (Bagolini, Bressan 1994; Pessina, Ferrari, Fontana 1999), ki je na območju severnega Jadrana splošno razširjena že pred polovico sedmega tisočletja uncal. BP (Biagi, Starnini, Voytek 1993, 61).

Morda je bil poznejši prevzem poljedelstva (Turk et al. 1993, 71) in prehod v sedentarno obliko poselitve na Krasu, ki se kaže tudi s postopnim ponehanjem premikov med obalo in notranjostjo, prav rezultat teh stikov, ki so privedli do popolne odvisnosti kraških skupin od biološko udomačenih virov.

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Neolithisation of the Karst

Translation

INTRODUCTION

In the last twenty years, it has become increasingly clear that part of the archaeological data about the neolithisation of the Karst is more or less unreliable, since its origin is unreliable and therefore problematic. These findings have unfortunately not lead to a critical and selective use of data and have not been constructively included in the otherwise lively debate about the transition from the Mesolithic to the Neolithic on the Karst. The original intention of this contribution was therefore to check and evaluate the reliability and usefulness of published archaeological data which may be relevant for understanding neolithisation processes on the Karst, and through their selective use, to offer another "view".

The structure of archaeological data and their interpretation are also determined by contemporary social needs and contemporary social contexts (Hodder 1986). This relation is well seen in the picture of the early prehistory of the Karst, at least in some fields, and I have tried also to show it. I thus wanted to draw attention to the effect of "social taphonomic agents", perhaps the most influential of the "taphonomic agents" which have helped create the picture of the distant past of the Karst that we know today.

The basic questions that I try to answer in the contribution are: How was the archaeological picture of the Mesolithic and Neolithic on the Karst formed? What is the interpretative value of the archaeological data that built this picture? Can we recognise processes that lead to the transition to a cultivation economy? If we can, on the basis of what data? What were the subsistence systems of the Mesolithic and the first Neolithic groups? Where did changes appear and what were the causes of them? I seek answers in the historical development of prehistoric archaeology on the Karst. By using the concept of *stratigraphic contextuality*, I try to use those data that appear to me to be credible, so mainly data determined by stratigraphic contexts. I construct my view of the neolithisation of the Karst mainly with the use of archaeological data, and to a slightly lesser extent also using data from sedimentological and palaeovegetational research and analyses of the material culture.

The region that interests me is the Karst. The Karst is a fairly sharply defined region, its boundaries only being soft in the east. To the south it is bounded by the Bay of Trieste, to the north by the Vipava valley, to the west by the Friuli plain, and to the east the Brkini hills. Of a total area of around 500 m^2, the major part of the region is located in Slovenia, only the coastal and western part of the Karst belonging to Italy. The Karst has the form of a plateau, inclined towards the northwest, which is on average 550 m higher around Divača and around 80 m lower on the edge of the Friuli plain.

The geological base of the Karst is Cretanaceous and Tertiary limesone and dolomite, and in a very few places also flysche. Limestone is soluble in water and the surafce of this is additional tectonically cracked. So rainfall quickly disappears into the interior unless it is held by vegetation and humus. So despite relative wetness, there are no surface waters on the Karst, and even standing waters are very rare. The structure is dominated by subterranean caves and underground streams, which exit along the edge of the Karst.

The Karst is covered by terra rossa and brown carbonate soils or rendzina. Except in pockets and in dolinas, the soil is too shallow and normally unsuitable for agriculture. Today, the region is covered by karst forest, but a century ago, because of intensive grazing and cutting, the Karst was bare rock (Poldini 1989; Culiberg 1994).

I have tried in the contribution to stick to the geographic boundaries of the region, although I have treated them softly and sometimes have also enlarged the space of observation to the immediate vicinity of the region.

I have similarly treated loosely the time interval embracing the events of which I am writing. The events I am observing occurred within the period of time that is marked in this space by the transition from the Mesolithic to the Neolithic periods. The reason for such a delineation is primarily the lack of firm absolute dates. On the basis of the radiocarbon dates obtained until now, it can certainly be seen that it is possible to frame the Mesolithic period in the time interval from the mid-10^{th} to the mid-7^{th} millenium and the Neolithic from the mid-7^{th} to the 6^{th} mid-millenium cal. BP (Guerreschi 1999, 83-84; Montagnari Kokelj et al. 1996). I have treated the boundary between the periods similarly softly.

I have tried to understand the course of the neolithisation of the Karst mainly on the basis of published archaeological data. I understand and treat neolithisation as the transition to a cultivation economy (see Zvelebil 1986), because of which I have focused attention on of the basic economies of Mesolithic and Neolithic communities. I have noted mainly faunistic and botanical remains at sites, but I have not entered into the symbolic and ideological aspects of neolithisation. Since I was primarily interested in the economic aspects of the transition, I did not go too deeply into the question of the typology of remains, despite the fact that this theme is most present in discussions on the neolithisation of the Karst and it determines the basis of the concepts *Mesolithic* and *Neolithic*. I have not compared events on the Karst with events in surrounding regions, although in forming my own views I have taken into account events in the vicinity.

DISCOVERING THE MESOLITHIC AND NEOLITHIC ON THE KARST

A general, analytical history of prehistoric research on the Karst has not yet been written. Only a few contributions are available, which are mainly related only to the Italian part of the Karst (e.g., Cannarella 1984a), and normally deal with only specific areas of this theme (e.g., Cannarella 1984b; Leben 1959; Montagnari Kokelj 1993; Moretti 1980). I have therefore tried to supplement the picture with my own observations and, above all, with information kindly communicated to me by the experienced expert on the history of Triestine caving, Mr. Pino Guidi.

The course and intensity of archaeological research on the Karst are not continuous in either the temporal or spatial dimensions. Interest in the prehistory of this region differed in different periods, and the development of political boundaries of the space greatly influenced its accessibility and understanding.

The beginnings of prehistoric research on the Karst go back to the second half of the 19^{th} century, to the time when the Karst belonged to the Austro-Hungarian monarchy. The intellectual core of the littoral part of the monarchy, which was bound to the ever stronger bourgeoisie, was the flourishing city of Trieste, and to a much lesser extent also Gorizia and Koper. Even before then, at the time of Humanism and the Renaissance, the first great private collections were created in these centres, which kept in addition to works of art also series of palaeontological

and archaeological finds, so-called curiosities. In line with the guidelines of this tradition, in parallel with the founding of public museums they were created by circles of intellectuals, who went beyond an antiquarian understanding of these *artificialia* and *naturalia*. They also began to collect *curiosa* so that they could start talking about the distant past.

The main protagonists of this period which, because of the dramatic socio-political changes in the twenties of last century, can be demarcated by the end of the First World War, were the physician, C. Marchesetti, the director of the Natural History Museum in Trieste, and the teacher, K. Moser, who was supported by scientific institutions in Vienna. Their opus not only testifies to the then intensive research of the Karst, it also reflects the two poles of the then hot political atmosphere.[1] However, both excavated numerous sites and discovered traces of prehistoric communities. K. Moser above all directed his interest into archaeological remains from caves and summed up events in the monograph *Der Karst und seine Höhlen* (1899). In contrast to C. Marchesetti, who excavated numerous locations in Istria, on the Karst and in Posočje, K. Moser intensively studied caves predominantly on the Karst, and mainly in the vicinity of Nabrežina (Aurisina). C. Marchesetti, too, excavated a great deal in caves, but he also invested great efforts into studying forts and in excavating graveyards in Škocjan and Most na Soči. Both normally published the results of their research, although often in the form of preliminary and thus very modest articles. They not infrequently report on Neolithic finds. Such a definition of their finds appeared to be justified in many cases, since later review research at least partially confirmed this,[2] although the content and characteristics of the concept "Neolithic" at that time differed somewhat from today's.

In Fascist *"Ventennio"* because of the political will and the atmosphere, archaeological research focused on discovering Roman remains (Bandelli 1991; Bitelli 1999). The work of the archaeologist, R. Battaglia, assistent professor at the University of Padova, who continued study of the prehistoric Karst and other regions even in this period was an exception. Battaglia judged the majority of prehistoric remains discovered to be Neolithic, since he suspected that the caves were mainly settled in that period (see Battaglia 1927). It was shown that a good part of these finds were more recent (Leben 1959; 1967).

At the end of the Second World War, the new border between Zones A and B, which became the Yugoslav-Italian state border in 1954, split the Karst into two. The hinterland of Trieste was essentially contracted in all aspects, the research space of "Triestines" was restricted to the narrow belt of Karst that had been awarded to Italy in 1947 and the Province of Gorizia (*Provincia di Gorizia*), which was included administratively, became part of the hinterland of Gorizia and flourishing Tržič (Monfalcone), which in comparison with Trieste were practically without institutions capable of archaeological research. There was a similar situation in the Yugoslav part of the Karst, where archaeological research took place in the shadow of primary political and social interests. i.e., the building of a new state.

In the post-war period, therefore, archaeology "happened" mainly on the territory characterised by a new concept - the *Triestine Karst* (Carso Tristino). Intensive speleological research was also concentrated here, which contributed to a major extent to the discovery of the prehistory before the so-called "castellieri" period. Cavers often discovered archaeological remains during exploration of the underground, so that groups of archaeological amateurs were soon formed among them. The Triestine *Soprintendenza*[3] often allowed these groups or individuals to excavate caves, so it was actually amateurs[4] who most often excavated archaeological deposits. These undoubtedly include the very active members of the society *Società alpina delle Giulie,* F. Stradi and F. Legnani, and the member of the society *Gruppo ricerche di paleontologia umana dell'Associazione XXX Ottobre (Club Alpino Italiano)* G. Marzolini. The member of the financial police, D. Cannarella, excavated in caves a great deal, and was later employed as an associate at the Soprintendenza. Similarly, but to a lesser extent, G. Stacul from the University of Trieste and G. Cremonesi, C. Pitti and A. M. Radmilli from the University of Pisa, carried out archaeological excavations. The situation changed slightly in the seventies, when F. Maselli Scotti took over leadership of the Soprintendenza, and in compliance with state law did not allow amateurs to carry out independent archaeological excavations. Nevertheless, cavers still today discover archaeological remains in caves, although rarely, and in some cases deliberately look for them (see e.g., Rucavina 1996; Marzolini 1998). A. Riedel undoubtedly belongs among the "great" personalities who created the picture of the prehistoric Karst. He was a geologist by profession, but he became an experienced expert in determining and analysing remains of fauna. It is almost entirely thanks to him that today we have available this series of data which was not long ago considered second class (Montagnari Kokelj 1993, 77). Today, archaeological excavations are taking place in the cave of Stenašca (Grotta dell'Edera) under the leadership of P. Biagi from the University of Venice, which are important for understanding the Mesolithic and Neolithic on the Karst (Biagi, Starnini, Voytek 1993).

On the Yugoslav side of the Karst, the first systematic excavations of early Holocene layers took place in the fifties, when M. Brodar from the *Institute of Archaeology of ZRC SAZU* came across suspected Mesolithic remains in Ozka špilja[5]. The next excavations, during which they discovered layers with Neolithic finds for the first time in this part of the Karst, only took place in 1974, in Trhlovca near Divača. They were lead by F. Osole from the Department of Quartarology of the University of Ljubljana. This research took place in the spirit of a wider project of discovering Palaeolithic forts in Slovenia and mainly in Pivško. Soon after Osole, F. Leben began to excavate in Trhlovca and Mala Triglavca, and he came across layers with numerous Mesolithic remains for the first time in this part of the Karst. Some discoveries were also made thanks to the caver and archaeological amateur, V. Saksida. A team from the Institute of Archaeology of ZRC SAZU carried out trial excavations in Acijev spodmol and Podmol near Kastelec from 1989-1991 (Leben 1988; 1990; Turk et al. 1992; 1993).

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[1] I am thinking here e.g., of the strengthening of irredentist ideas. The antagonism between Marchesetti and Moser is certainly reflected in scientific publications (e.g., Marchesetti 1890).

[2] Thus, e.g., for Pečina pod Muzarji, Pejca v Lascu, Pejca na Doleh, Pečina na Leskovcu, Terezijina jama and Čotarjeva pečina (Barfield 1997-1998; Montagnari Kokelj 1997).

[3] *Soprintendenza per i Beni Ambientali, Architettonici, Archeologici, Artistici e Storici* (Inspectorate for Spatial, Architectural, Archaeological, Artistic and Historical Heritage).

[4] D. Cannarella (1984a, 451) finds that "... comunque, tra questi dilettanti pieni di entusiasmo troviamo anche chi saprà acquisire solide basi scientifiche e qualcuno che passerà alla vera e propria professionalità ...".

[5] Because of the fact that spelaeological, archaeological and geological data for the majority of locations dealt with were published in various popular and professional publications, and in view of the nationality and also political orientation of the researchers, as well as the different languages, sites do not have just one name. To mention as an example only the site for which I use the name Pečina na Leskovcu, but which is also known in the literature as Grotta Azzurra di Samatorza, Höhle bei den Haselstander

IDEAS AND THEORIES OF THE NEOLITHISATION OF THE KARST

Writing about the first Neolithic communities on the Karst on the basis of excavations is not a new theme, since the first attempts in this direction had already taken place towards the end of the 19th, and above all from the second half of the last century.

The oldest archaeological discoveries in caves on the Karst were a reflection of the wider cultural and historical European context, when the chain reaction of archaeological exploration of the underground triggered the discovery of caves with spectacular traces of *troglodites* in France and Spain (Cannarella 1984a). The quest for archaeological remains in caves became all the more attractive and although sensational discoveries were not made on the Karst, researchers were able to talk of the culture of the first Neolithic communities. C. Marchesetti reconstructed the following profile of neolithic man on the basis of excavations in Pečina pod Muzarji (Caverna degli Orsi): "... He devoted himself mainly to pastorage and had numerous herds of goats and sheep. He also bred cattle and pigs, though in smaller numbers ... Arable farming was unknown to him, on meeting (with game) he did not despise hunting, which offered him a great deal of prey among the game of the extensive forests that spread in the vicinity of his basin. However, he often undertook long journeys and set off for the sea coast and demanded tribute from it. He was not a fisherman ... he was satisfied with shellfish which live attached to coastal rocks, ... or he dived and collected those that live in the shallow waters ... Although he had no knowledge of metals, he had acquired the knowledge of how to use stone and bone for making weapons and for designing domestic aids ... He was above all a master of the art of pottery, which already appears to be very developed ... Raw materials ... that he did not find in our lands he imported from more or less distant places ..." (Marchesetti 1890, 182-183).[6]

The first explanations of the neolithisation of the Karst and the genesis of Neolithic cultures only go back to postwar times. It is interesting that the Yugoslav researcher, J. Korošec, was the first to engage in this. Using mainly data from sites in territory awarded to Italy (Korošec 1960), he constructed his explanation of neolithisation only on the basis of pottery material from several caves which, because of unreliable stratigraphic provenance he had "... to use as a whole, irrespective of which cave it had been found in ..." (ib., 8). On the basis of typological comparison, he divided Neolithic pots into three cultural chronological groups. He defined the older group as Impressed (Impresso) or Cardium pottery, the middle pottery as being from the Danilo cultural circle and the youngest pottery was typical of the Hvar culture. Korošec did not exclude the possibility of the existence of a transitional period before the Neolithic, which he understood as non-pottery Neolithic, and this would not have taken part in the transition, since he explained neolithisation as a result of the settlement of new peoples with a new culture (ib., 28-29). Because of the typological incomparability of pottery of the oldest group with the middle group, he similarly explained the genesis of the middle as a result of settlement of new ethnic groups. The relation between the groups would thus have been exclusive. His view took firm hold in Yugoslav archaeology, and its influence can be seen right up to today (Leben 1979; 1988; Turk et al. 1993).

At the end of the fifties and start of the sixties, mainly in Pečina na Leskovcu (Grotta Azzurra di Samatorza), but also in other caves, remains were discovered that were identified for the first time on the Karst as Mesolithic. The views then presented on the development of the Karst Mesolithic were widely accepted in archaeology[7] and were retained as a basic frame of reference for all subsequent research right up to today (Montagnari Kokelj 1993). For the first time, the changes in culture were also explained as a result of the changing natural environment (Radmilli 1963; Canarella and Cremonesi 1967).

Discoveries of Mesolithic remains in the area of the Triestine Karst strongly influenced the development of the theory of processes of neolithisation. D. Cannarella then rejected continuous development from the Mesolithic to the Neolithic, but in contrast to Korošec, he sought the impulses for change in the Danubian space and not in Dalmatia. He believed that the Karst functioned in the Neolithic as a bridge between East and West, across which Neolithic cultures spread into the rich Italian plains (Cannarella 1968, 163-165).[8]

At the same time, F. Legnani published his views on the genesis of the Karst Neolithic. He explained neolithisation by the arrival of new peoples from Thessaly, who developed an autonomous culture on the Karst. On the basis of the typological characteristics of pottery, he divided this culture into chronological groups and sub-groups, among which he called the oldest *Karst Neolithic I - the time of ovoid pedestalled vessels*. At the same time, he divided Karst Neolithic I into an older, *A phase*, with typical ovoid pedestalled vessels with smooth surfaces, which appear together with the pottery of the Impresso pottery culture, and a younger *B phase*. In this the guiding elements were ovoid

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nach Samatorca, Jepavkna jama, Pečina na Jescoucah, Lescocica, Leskovica or Leskovich and Leskovec, Pečina na Leskovcah, Pečina na Leskovicah, Jama Plava, Caverna presso Samatorza, Caverna presso Samatorizza, Höhle bei Samatorza, Blaue Grotte, Haselnusshöhle, etc. I use only the name that seems to me closest to the Slovene original. P. Guidi (1996) provides a good review of names of caves of the Triestine Karst, which in most cases I also use.

[6] Egli si dedicava principalmente alla pastorizia, possedendo numerose gregge di capre e di pecore. Il bue ed il majale venivano del pari allevati, se anche in minor numero ... Ignota gli era l'agricoltura, all'incontro non isdegnava la caccia, che gli offriva larga preda di selvaggina nelle ampie foreste, che si stendevano all'ingiro della sua caverna. Ma egli imprendeva spesso lunghe peregrinazioni e scendeva alla riva del mare per domandargli i suoi tributi. Non era pescatore ... e quindi s'accontentava dei molluschi che vivono attaccati agli scogli della sponda ..., oppure si tuffava in acqua per raccogliere quelli che vivono a poca profonditá ... Se anche non aveva alcuna conoscenza dei metalli, egli sapeva adoperare magistralmente la pietra e l'osso a costruire le sue armi, a foggiare i suoi utensili domestici ... Maestro egli ci si rivela specialmente nell'arte del figulo, che appare gia grandemente progredita ... I prodotti di altre terre ... del tutto estranee alla nostra provincia ... dovevano venir importate da piú o meno lontane regioni ..." (Marchesetti 1890, 182-183).

[7] The question of the existence of Mesolithic cultures in Italy was then very topical. French archaeologists, namely, claimed that Mesolithic cultures (mainly the Early Mesolithic - Sauveterian and Late Mesolithic - Castelnovian or Tardenoisian) did not spread in the Appennine Peninsular but that Late Palaeolithic cultures lasted there until the Neolithic. This suggestion seemed unacceptable to Italian archaeologists, so from the end of the fifties they began to seek evidence for the existence of Mesolithic cultures on the Appennine peninsular. Their expectations were soon realised (Radmilli 1963; 1973-1974a; 1973-1974b; 1984b; Andreolotti, Gerdol 1972; Broglio 1980).

[8] However, it is not clear on the basis of what data Cannarella constructed this explanation. Perhaps in this he took account mainly the finds about which Korošec had already written (1960).

pedestalled vessels with engraved geometric or naturalistic ornaments, and alongside these appeared also typical "italic" Middle Neolithic pottery (Legnani 1968, 27-29).

On the basis of material mostly excavated by K. Moser, L. Barfield presented an alternative explanation of the neolithisation of the Karst in 1972, which official archaeology still today partly advocates and uses (for example Gilli, Montagnari Kokelj 1993; 1994-1995; Montagnari Kokelj 1997; Montagnari Kokelj, Crismani 1996; Biagi et al. 1993), mainly because of the solid typological framework that this explanation offers. Barfield defined the original Neolithic with the concept of the *Vlaška* cultural group, which emerged as a result of the acculturation of the Mesolithic population of the Karst through contact with populations that had developed in the Danilo and Kakanj cultures. In Barfield's opinion, it is not possible to speak of an older Neolithic on the Triestine Karst, which Korošec had previously determined, since he rejected the suggestion that fragments of Impresso or Cardium pottery had ever been found on the Karst. This would have for the most part appeared on the Karst as an import in the context of the Vlaška group. He saw evidence of continuity from the Mesolithic in the continuous settlement of the same caves during the period of the Vlaška group that Mesolithic communities had used and in the continuation of the Mesolithic tradition of collecting sea molluscs. He believed the Vlaška group, despite the strong links that can be traced in material culture with the Middle Mesolithic Danilo culture, could be dealt with independently, and it appears as a more impoverished form of this culture. Barfield thus identified the genesis of the Vlaška group with the neolithisation of this space. Put another way, the first Neolithic culture on the Karst that could be characterised by the full Neolithic package, permanent residence, arable farming and lifestock breeding, use of polished stone tools and pottery, only developed in the Middle Neolithic (Barfield 1972, 201-204).

After Barfield, Š. Batović again actualised Korošec's view of the development of the neolithic. He summarised its tripartite division, gave events a wider chronological context, but in contrast to Korošec, he argued an autochthonous and continuous cultural development from the Mesolithic to the Iron Age (Batović 1973, 64-68, 119). He explained neolithisation as a result of autochthonous development from the Mesolithic into the Early Neolithic and concluded that "... the domestic Mesolithic population continued life in the Neolithic and only adopted Impresso pottery as a new gain of the culture spreading from Dalmatia northwards, or that the domestic Mesolithic population began to produce pottery through gradual independent development ..." (ib., 72).

From the mid-seventies and in the eighties, the majority of interpretations of the transition to the Neolithic on the Karst mean above all a mass of contributions based on a combined use of the aforementioned concepts (e.g., Steffè de Piero 1978a; Leben 1979; Bagolini, Biagi 1978-1981), and the same applies also for understanding the Mesolithic. In the eighties, the attention of numerous researchers of the prehistory of the Karst was again directed into the study Mesolithic remains. Numerous reviews of excavations were carried out, but they did not essentially change the knowledge to that time about the Karst Mesolithic. Major attention was then devoted to sedimentological analyses of cave deposits (Radmilli 1984a), by which an extensive database was collected, but it was not known how to constructively include the results in archaeological discussion.

In the last decade, in attempting to understand the neolithisation of the Karst, increasing attention has begun to be paid to the context of discoveries of archaeological remains, their documentation and interpretation (Montagnari Kokelj 1993; Budja 1993; 1996b). It increasingly appeared that the major part of archaeological data from sites on the Karst is problematic and that it is possible to follow the process of neolithisation only through reinterpretation of archaeological texts and review analyses of archaeological material discovered during past excavations. New views, because of the "labile character" of archgaeological data have triggered fresh and sharp debates, the result of which has been a dual explanation of the neolithisation of this space.

According to the first, the Neolithic first appears on the Triestine Karst as a new cultural phenomenon with almost no link with the previous Late Mesolithic (Montagnari Kokelj 1993, 80). Discontinuity is shown above all by typological studies of Mesolithic and Neolithic material and differences in the use of raw materials, from which would follow that they appeared exclusively. Fragments of pottery in the castelnovian context would thus more reflect sporadic short-term visits of members of various groups than continuous use of the location on the part of a single population (ib., 81; Montagnari Kokelj et al. 1996, 229-230, 232; Ciccone 1993). Neolithisation would have appeared later here than in other parts of the Adriatic, since in the late 6th millennium BC, the Karst still functioned as a shelter for hunters and gatherers (Ammerman, Cavalli Sforza 1984; Biagi, Starnini 1997-1998; Chapman, Müller 1990; Müller 1994).

According to the second explanation, the process of neolithisation can be defined as a transition to agriculture that can be recognised on the Karst in Mesolithic contexts (Budja 1993; 1996a; 1996b). This approach is based on the hypothesis that it is necessary to take into account the effect of "filtered" or selective adoption of individual elements of a cultivation economy on the part of Late Mesolithic hunter-gatherer communities. On the Karst it ise possible to interpret remains (mainly in the form of remains of domesticated animals and pottery, palaeovegetational traces and prestige and symbolic objects) showing that Mesolithic communities here established contact over long distances and began to develop or perhaps selectively adopt a cultivation economy. This finding can be supported at the same time by analysis of the settlement pattern on the Karst plateau, which did not change in the Neolithic (Budja 1993, 173-178; 1996a, 64-49; 1996b).

It follows from the above that in explaining the process of the neolithisation of the Karst two main approaches were established. The first is connected with the genesis of the Impresso-Cardium culture and the earlier Neolithic (Korošec 1960; Leben 1967; 1975; Batović 1973; 1979; Legnani 1968), and the second based on the view that the Karst was neolithised last in the process of the neolithisation of the eastern Adriatic coast, or that the process of the neolithisation of the eastern Adriatic coast only ended with the appearance of the Vlaška group, which is chronologically and culturally developmentally more or less connected with the Danilo Middle Neolithic culture (Barfield 1972; Chapmann, Müller 1990; Müller 1994). Common to both is that the start of the Neolithic is mainly explained by the appearance of pottery, including when it appears in Mesolithic contexts (Batović 1973). Almost all interpretations are therefore based for the most part on studies of one type of material, pottery, and to a great deal lesser extent take into account other testimony, which greatly limits the grasp of neolithisation as a process of transition into a cultivation economy. The internal division of the Neolithic is similarly based only on the development of typologically characteristic pottery, whereby the three stage division of the Neolithic is determined by diagnostic types of pottery; impressed cardium pottery characterises the Early Neolithic, ovoid pedestalled vessels and rhyta the Middle Neolithic and e.g., Hvar bowls the Late Neolithic (Korošec 1960, Batović 1973; Leben 1967; Gilli, Montagnari Kokelj 1992; 1993; Müller 1994). Both approaches are fundamentally based on different interpretations of fragments of impressed pottery, which according to the first explanation proves the existence of an Early Neolithic culture on the Karst, and according to the second, impressed pottery is only an indirect indicator of contacts between Mesolithic or Middle Neolithic cultures on the Karst and cultures in the

eastern Adriatic (e.g. Barfield 1972; Müller 1994).

Pottery with impressed ornament was discovered on the Karst in unknown stratigraphic contexts in various caves,[9] which means that its contextual interpretation is today impossible (Montagnari Kokelj 1993, 81). The only exceptions may be fragments of pottery with impressed or impressed cardium ornament, which were found in the lower part of layer E in Pečina na Leskovcu (Cannarella, Cremonesi 1967, 298, t. 5). Together with these shards in the same layer were also fragments of ovoid pedestalled vessels, which in some cases had hanging triangles engraved under the lip (ib., 16, t. 4). Batović placed one of the two shards with impressed ornament together with some fragments of ovoid pedestalled vessels and one plate in the second stage of the Early Neolithic (Batović 1973, t. 2: 9-13), but Müller but the same shards[10] in the context of the Vlaška group and rejected the possibility that these elements could prove Early Neolithic settlement of the cave (Müller 1994, 141). It cannot be overlooked that in making their assessment, both partially ignored the stratigraphic framework of the finds and dealt with the pottery according to typological criteria.[11]

Because of the prevailing premise that ovoid pedestalled vessels, together with rhyta, are diagnostic pottery types of the Middle Neolithic and closely connected with the Danilo Culture (Barfield 1972 and 1997-1998; Steffè de Piero 1978a; Gilli, Montagnari Kokelj 1992 and 1993; Montagnari Kokelj, Crismani 1996; Biagi, Starnini, Voytek 1993), the presumption was increasingly established that the Neolithic began on the Karst at the time of the Eastern Adriatic Middle Neolithic[12] or in the transitional phases of the Early Neolithic (Bagolini, Bressan 1994, 67). Legnani's hypothesis that ovoid pedestalled vessels were already present in the Early Neolithic (Legnani 1968) remained in the background (Bagolini, Biagi 1978-1981, 192), despite the fact that his view was later also partially confirmed.[13] In addition to shards with impressed cardium ornaments in the context of ovoid pedestalled vessels, from layer E in Pečina na Leskovcu, other arguments also raise the possibility of an Early Neolithic existence of ovoid pedestalled vessels. One of these is the find of fragments of pottery decorated in Barbotin technique in the oldest Neolithic context of Trhlovca (Tomaž 1999), in Pečina v Gmajni (Grotta Gigante, Andreolotti, Stradi 1971, 112, t. 4) and also perhaps in Mala Triglavca and in Pejca v Lascu (Grotta del Pettirosso, Tomaž 1999, 56). Barbotin is documented in the oldest contexts of Albania (Korkuti 1995), and there is a suitable comparison for it nearest to the Karst in the Early Neolithic context of Impresso-Starčevo, as well as in the oldest contexts of the South Balkans (Andreolotti, Stradi 1971, 112; Tomaž 1999, 56, note 266). In context of the Impresso-Cardium culture in the East Adriatic Coast, in addition to impressed pottery, pottery decorated with a brushing technique also frequently appears (Müller 1991, 317, 327; 1994, 117, 119, 126-127, 310-344), so Korošec (1960, 9, 13-14) and Leben (1967, 65-57) also based the existence of Early Neolithic on the Karst in part on this type of decoration. Fragments of pottery with brushed surfaces have been found together with ovoid pedestalled vessels in numerous caves on the Karst, in Podmol near Kastelec (Turk et al. 1993, 58-59), Pejca na Doleh (Caverna Moser, Barfield 1997-1998, 31-38), Podmol near Repentabor (Riparo di Monrupino, Bertoldi 1994-1995, 152), Mitreo cave (Grotta del Dio Mithra, Stacul 1971-1972, 48-49) and Pejca v Lascu (Korošec 1960, 13-14). It can certainly be seen that both brushing and barbotin cannot be bound to a narrow period, since they appear over an extended time span (Pergar 2002; Radmilli 1982-1986, 159; Stacul 1982, 58-59; Tomaž 1999, 53; Velušček 1995), so that this argument in proving the age of pottery groupings on the Karst remains on the level of hypothesis.

The debate about the first appearance of pottery on the Karst appears more interesting if we include in it data from Stenašca cave. In Stenašca, in Late Mesolithic layer 3a, which is defined by geometric stone tools, fragments of unornamented pottery were also discovered (Biagi, Starnini, Voytek 1993, 61). Above it lay Neolithic layer 2a, in which the remains of a typical Danilo rhyta were found beside the deepest hearth, which appeared on the basis of archaeometric analysis to be of local manufacture (Spataro 1997-1998, 87). The pottery in this layer differs completely from that in layer 3a, as well as from fragments of typical vessels which correspond typologically to pottery of the Vlaška group, and fragments were also found there of a ladle with a spout (Biagi, Starnini, Voytek 1993, 61).

As had been said before this, the earliest appearance of pottery on the Karst was connected with the Early Neolithic (Impresso culture) or Middle Neolithic (Vlaška group) context. We return again to the only example of a find of impressed pottery in a known stratigraphic context (layer E in Pečina na Leskovcu). All authors are agreed in relation to this find that the pottery is certainly connected to Mesolithic settlement of the cave (Cannarella, Cremonesi 1967; Batović 1973, 66-68; Müller 1994, 141, 191). We can therefore justifiably claim that impressed cardium ornament does not characterise the oldest type of pottery on the Karst, which Müller also demonstrated (1994). The same also applies for other supposed oldest types, i.e., fragments of pottery with barbotin or brushed ornament. The type of the oldest pottery has to be seen in the Late Mesolithic context of Stenašca, which is monochrome unornamented pottery (Biagi, Starnini, Voytek 1993, 61; see also Parzinger 1993, 53, 77-79).

The debate can also first be developed with the aid of radiocarbon dating.[14] Interesting relations, namely, are established

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[9] Lists of Karst sites with Impresso pottery differ from author to author. On Leben's and Müller's lists the sites are Pejca v Lascu, Pečina pod Steno, Pejca v Zavodu, Pečina pod Muzarji and Pečina na Leskovcu (Leben 1975, 145-146; Müller 1994, 310-311). Montagnari Kokelj, Crismani (1993, op. 13) do not cite Pejca v Zavodu but Orehova Pejca. Batović cites in addition to the aforementioned also the cave Grotta Gialla (Batović 1973, 64). Velušček believes that this type of pottery was not found in Pejca v Lascu (Velušček 1997).

[10] In addition to two shards with impressed decoration (Cannarella, Cremonesi 1967, 298, t. 5: 1,2) Müller cites a further fragment for which he claims that it has impressed (cardium?) ornament (Müller 1994, 141. op. 163). In fact, this fragment only has engraved parallel lines (Cannarella, Cremonesi 1967, 296, t. 4: 5).

[11] Batović, e.g., sets material from layer E in various phases of the Early, Middle and also Late Neolithic (Batović 1973, t. 2; 4; 5; 9), but Müller, e.g., did not take into account the fact that a vessel with painted decoration was found in the same layer (Müller 1994, 141, 191; see also Cannarella, Cremonesi 1967, 296, t. 4: 4).

[12] In fact it can be seen that the leading form of pottery of the Vlaška group, a ovoid pedestalled vessel with typical engraved decoration in a motif of hanging triangles, is found only rarely among pottery of Danilo contexts (Tomaž 1999, 54-55), the appearance of painted pottery in artefact collections of Triestine caves is also rare (e.g., Cannarella, Cremonesi 1967, 296), which is typical of pottery collections of the Danilo culture.

[13] Thus in Ansa cave, where part of the pottery and stone material was typologically comparable with Early Neolithic material in sites on the eastern and western Adriatic coast (Visentini 1992, 199-201).

[14] Authors who advocate a gradual extension of the Neolithic from the southern Adriatic towards the north, and later appearance

if C14 dating of the oldest Neolithic contexts with the ovoid pedestalled vessels and fragments of rhyta on the Karst is compared with Early Neolithic dates from Istra (Vižula). The oldest radiocarbon dated Neolithic context on the Karst (Stenašca, layer 2a) is put at 6615 ± 390 BP (GX-19568) or 6590 ± 100 BP (GrN-23129) and lies above the layer in which monochrome unornamented pottery was found together with geometric tools (layer 3a), which is dated to 6700 ± 130 BP (GX-19569) (Biagi, Starnini, Voytek 1993, 61; Spataro 1997-1998, 66). The oldest pottery from this cave is therefore chronologically comparable with that which Müller put in his "Impresso A stage" (Budja 1996a, 325), and the oldest Neolithic record from layer 2a is older than the Middle Neolithic Danilo culture.[15] It therefore appears that linking ovoid pedestalled vessels and rhyta with this culture is dubious, and in this connection it is necessary to seek the start of the Neolithic on the Karst in periods before the start of the eastern adriatic Middle Neolithic Danilo culture. This suspicion is slightly more justified if we take into account data on the appearance of the first domesticated animals in Late Mesolithic contexts in caves on the Karst; in Pejca na Sedlu (Grotta Benussi) this is dated to between 7620 ± 150 BP (6600-6270 (6464) cal. BC) and 7050 ± 60 BP (5991-5824 (5933) cal. BC) (Riedel 1975; Biagi 1994, 60).

Comparison of the time of appearance of the Neolithic on the Karst and in neighbouring Friuli also appears interesting. If we look at the start of the Neolithic along the western coast of the Central and North Adriatic, C14 dates available show that the once clear south-north chronological gradient (Bagolini, Biagi 1990) has disappeared. The first agricultual settlements from the area of Abruzzo and Marche, at least as far as radiocarbon dating is concerned, are contemporary with the first agricultural settlements in northeast Italy, on the Karst and in the Padova Plain (Pessina, Rottoli 1996, 97; Improta, Pessina 1999, 112). The oldest C14 dating for the Early Neolithic in Friuli is in Piancada, followed by datings from Sammardenchia and Fagnigola.[16] These dates show that the appearance of the Neolithic on the Karst (layer 2a in Stenašca) was contemporaneous with the start of the Neolithic in Friuli where, in contrast to the Karst, it already then appears as a firmly established phenomenon[17] (Ferrari, Pessina 1996; Pessina, Rottoli 1996; Pessina, Muscio 1999).

The question that I raise at this point is whether, on the basis of the aforementioned, it is still justified to characterise the appearance of the Neolithic on the Karst with the Middle Neolithic Vlaška group. It can be seen, namely, that the start of the Neolithic on the Karst cannot be linked to the Middle Neolithic, not in the sense of either the Eastern Adriatic or Western Adriatic Neolithic. The genetic link of this group with the Danilo Culture is similarly doubtful. It can also not be overlooked that, in contrast to the Early Neolithic in Friuli and in the Eastern Adriatic, the Vlaška groups does not appear to be a stable Neolithic phenomenon. Neolithic settlements are not documented on the Karst (Montagnari Kokelj 1993), and similarly the use of domesticated plants is not (for some time further) documented (Turk et al. 1993, 71; Budja 1996b, 68). It can be seen that strategies of the use of space with the transition from the Mesolithic to the Neolithic do not essentially change (Budja 1996b, 68-69). The Early Neolithic on the Karst thus does not appear as a "completely Neolithic" phenomenon, such as, for example, that which characterise groups in neighbouring Friuli, but a phenomenon which, although it can already be called Neolithic, must be understood as a stable and lengthy phase in the process of transition.

CRITICAL ANALYSIS OF STRATIGRAPHIC CONTEXTUALITY OF MESOLITHIC AND NEOLITHIC REMAINS ON THE KARST

The neolithisation of the Karst is today a "hot" topic (Budja 1993; 1996a; 1996b; Montagnari Kokelj 1993; Müller 1994; Velušček 1995). The reason for this is not the discovery of new data to keep the fires burning, but the possibility of different uses of old data. Because of the contexts in which they were collected,[18] in other words, the same data can be used in various ways - even for proving contradictory theories.[19] So the original intention of this contribution was to check and assess the reliability and usefulness of published data relevant for understanding the coming of the Neolithic to the Karst.

Tracing remains that testify to processes of the coming of the Neolithic to the Karst is not an easy task. Above all, this task on the Karst is twofold. In recognising processes of neolithisation, it seems to me crucial that we are dealing with contextual data. Because of the type of data available to me, I was obliged to restrict the notion *context* to the most basic and very limited parametres. One possibility for delineating and determining the context of finds of which I can make use, since publications of sites on the Karst allow this, is the use of frameworks that determine individual stratigraphic units within archaeological deposits. Put another way, we can only "objectively" follow the process of neolithisation if we take into account only archaeological remains of which the stratigraphic context is known. Those contents that may be relevant for understanding the neolithisation process but do not have stratigraphic context are, in my opinion, unuseable in such a theme and in the solution of very specific archaeological problems.

Before talking about the stratigraphy of individual Mesolithic and Neolithic sites on the Karst,[20] I would like to draw attention

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of pottery in the area of the northern Adriatic for the most part pay heed to this type of data (Ammerman, Cavalli-Sforza 1984; Breunig 1987; Chapman, Müller 1990; Müller 1991, 329. See also Budja 1993; 1996b).

[15] The oldest dating of this culture is from Gudnja pećina and goes back to 6520 ± 40 BP (5490-5380) cal. BC (Müller 1994, 350).

[16] Piancada: sample R-2705 6751 ± 108 BP (5691-5525 cal. BC); Sammardenchia sample R-2547 6570 ± 74 BP (5569-5434 cal. BC); Fagnigola R-2547 6570 ± 75 BP (5565-5433 cal. BC) (Improta, Pessina 1999, 109).

[17] For Early Neolithic groups in the Padova Lowlands and Friuli, characteristic are: a) a general presence of a multi-cereal agricultural economy together with the cultivation of legumes, b) the existence of large settlements with houses and ditches, c) the presence of typical Neolithic elements such as clay female figures, testifying to an ideological world unknown to Mesolithic societies, d) a change in the provenance of raw materials in relation to the Mesolithic period, use of flint from the area of Monta Lessina and individual tools from obsidian, e) long distance trade and f) on the basis of circulating pottery, close contacts between Neolithic communities (Pessina, Rottoli 1996, 95).

[18] I am thinking here of different methods of excavation and their quality.

[19] Let me just mention as an example the situation by which different researchers dealt differently with fragments of pottery with impressed ornamentation: as evidence of the existence of the Impresso Culture on the Karst (Korošec 1960), as an import into Middle Neolithic or Mesolithic contexts (Müller 1991), or they denied that such fragments had been found on the Karst at all (Barfield 1972). It was possible to advocate such a mass of interpretations because the majority of fragments with impressed ornament were without stratigraphic context and it was thus impossible also to determine their archaeological context.

to the circumstances in which the archaeological data were collected. I cannot ignore the fact that one of the motives of the majority of excavations at these sites was the search for specific artefacts from the past. The excavators were mainly interested in stone tools, fragments of pottery of more attractive shapes or with ornamentation, decorated objects, in short everything which in certain cases in archaeological practice we still characterise as *special finds*. Other material did not excite so much interest, fragments of bone, stone flakes, unornamented fragments of the walls of vessels were sometimes not even collected.[21] There was even less interest in collecting palaeobotanic, geomorphological and sedimentological data. Only the experience of researching deposits with Mesolithic finds slightly changed this state and from the 80s onwards, this information also aroused interest (Montagnari Kokelj 1993, 77), and accordingly also the archaeological stratigraphy of the site. Unfortunately, such studies were only directed at the study of the Mesolithic, in excavating they really started to take into account other sources of data, and tried to reconstruct as far as possible the prehistoric circumstances, but it is also true that they completely ignored other archaeological periods. The opportunity to trace the processes of neolithisation was again lost.

The major obstacle to discussing not just the neolithisation of the Karst but also other archaeological problems in this field (cf. Carpani 1999), is the lack of precisely those narrower contexts about which I spoke earlier. This state is connected with the historical development of methods of cutting into archaeological layers and, above all, with the more or less major delay in the use of contemporary methods of excavation on the Karst. This is a state which can probably be linked to the fact that the researchers were for the most part amateurs.

The lack of data on the stratigraphic structure of archaeological deposits is greatly felt with sites which were researched prior to the Second World War. It is difficult to gather from Marchesetti's or Moser's reports what method they used to excavate deposits and what type of documentation they performed in the field. In more exhaustive contributions on sites which are relevant to the theme of this task (e.g., Moser 1899; 1903a; 1903b; Marchesetti 1890; 1895), such data is not cited. In view of the extent of their excavations, which were normally of short duration, it could be concluded that, at least to some extent, it was a matter of digging up deposits and searching for interesting remains from the past; the remains that they analysed and interpreted. Both describe the stratigraphy of cave deposits, but they probably saw them with the eyes of geologists. Finds were not treated in a stratigraphic context, and the same also applies for finds described by R. Battaglia (Battaglia 1927).

The clearest example of such a state and the effects of this is Pejca v Lascu, a site that the majority of authors have included in discussion on the neolithisation of the Karst mainly because of the assumption that Moser found in it fragments of pottery with impressed cardium ornamentation (Korošec 1960; Leben 1967, 65-68; Batović 1973). Even if the question of the truth of this discovery remains open (Velušček 1997), it nevertheless appeared that Moser found a lot of fragments of pottery in this cave characteristic of the oldest Neolithic contexts on the Karst (Barfield 1997-1998, 22-31). The greatest obstacle at this site is that none of the finds can be ascribed to a single excavated and documented layer (ib., 20), which means that we do not know which finds belong in the context of any particular layer. Because of this, data from Pejca v Lascu unfortunately remains unusable for the moment. Similarly, we cannot construct an interpretation on the basis of data from other caves in which Moser excavated, such as from Terezijina jama (Grotta Teresiana)[22], Čotarjeva pečina (Caverna Cotariova)[23] and Pejca na Doleh.[24] Data that Marchesetti cites for Pečina pod Muzarji[25] are similarly dubious, since in this case, too, the finds were not given stratigraphic provenance (Montagnari Kokelj 1997, 65).

Attempts at review analyses of the material obtained in such circumstances do not essentially change the usefulness and evidential value of data that might be relevant for understanding the process of neolithisation. An example of this is the exhaustive review publication of the potentially important material for understanding the neolithisation of the Karst from Pečina pod Steno (Grotta delle Gallerie, Gilli, Montagnari Kokelj 1993). The difficulties that are here concealed are apparently of secondary importance and certainly bridgeable (ib., 180-181). The lack of stratigraphic contexts of the finds, the mixed up nature of the material, the lack of quality data on the excavations in the opinion of E. Gilli and E. Montagnari Kokelj can be overcome by the use of "... analytical typologies which must certainly still be defined for Neolithic and Early Bronze Age material from the Triestine Karst ..." (Gilli, Montagnari Kokelj 1992,

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[20] I am trying to deal with all published sites in which Mesolithic and (or) Neolithic remains were found. This is mainly because I believe that it is potentially possible to trace in any Mesolithic or Neolithic record elements which could assist in understanding the neolithisation of some area.

[21] In some caves in which archaeological excavations took place, it is still possible today to come across a pile of fragments of bones which were separated from other, *more valuable* material. There is also a great deal of bones, flakes and much else in deposits that were created during excavations.

[22] K. Moser excavated 9 different layers in this cave (Moser 1903a, t. 7) and discovered typical remains of the oldest Neolithic on the Karst. He probably also came across layers with Mesolithic finds (Leben 1967, 70-71; Cannarella 1975-1977, 88; Barfield 1997-1998, 40-50).

[23] K. Moser together with M. Hofmannom also discovered here fragments of Neolithic pottery, among which were fragments of vessels with engraved or painted ornament (Barfield 1997-1998, 50-56). B. Lonza also excavated fragments of Neolithic pottery in the cave, and also discovered a hoe from deer horn (Cannarella 1975-1977, 76; see also Budja 1993, 178; Velušček 1997).

[24] In this cave, too, Moser came across a number of archaeological layers (Moser 1903b, t. 25; 26). He found two graves which, because of the absence of pottery, he determined as of pre-Neolithic age. The first was covered by stone blocks, above which was a layer in which among other things fragments of pottery were preserved. Around the skeleton lay fragments of the jaw of an otter (*Lutra lutra*), the shell of a tortoise (*Testudo sp.*), fragments of sea shells (e.g., *Unio margaritifer*) and stone and bone artefacts. The second skeleton lay in the same layer as the first, and from the top of the layer with pottery it was separated by a thin ashy band. In this grave, under the skull and fibula lay the shells of fresh water molluscs and horn and stone artefacts, beside the eye sockets lay stone flakes, a horn artefact and two split bones (Leben 1967, 60). Among the pottery that he excavated in the upper layers were some fragments of ovoid pedestalled vessels and rhyta (Barfield 1997-1998, 31-38).

[25] The excavated finds here are also typical of the oldest Neolithic phase of settlement of caves on the Karst (Montagnari Kokelj 1997, 71). As F. Leben (1967, 57; 1975, 145-146) and J. Müller (1994, 310-311) state, they found a fragment of pottery in the cave with pricking which was comparable with pottery of the Impresso-Cardium culture in Dalmatia.

67). Analytical typology in their view is a tool by which it is possible to seek the context of archaeological material from Pečina pod Steno, whereby it would be possible to recognise traces of the processes that led to the "Neolithic state". I personally believe that analytical typology is not a tool by which it is possible to reconstruct archaeological context and, above all, remains of processes of neolithisation in them. The exclusive use of analytical typology means destroying real stratigraphic and archaeological contexts and it only creates a tool by which these contexts can be again (artificially) constructed.[26] The result is groups of similarities and differences, not archaeological contexts, and into these groups the aforementioned authors also force the few remains whose stratigraphic context is known (Gilli, Montagnari Kokelj 1993, 160). Mainly because of this, published data from Pečina pod Steno seem to me unusable for understanding neolithisation processes.

Pečina pod Steno is merely a very clear example of a state that unfortunately also applies for numerous other sites. Two contexts are defined in these archaeological remains, which can be combined: stratum and typology. This approach is bound in first place to the phase of historical development of strategies and methods of archaeological excavation, when archaeology swore by the so-called *arbitrary method of excavation* (Harris 1989, 31-37). It normally involved cutting into deposits of a site with alternating, often horizontal spits (strata) of a previously determined thickness, and researchers of cave sites on the Karst most often used this method. They did not take into account the individual forms of layers, so that with a single spit they could remove a number of layers or their parts at the same time. On an assumption of consistency of archaeological sites, spits were treated as natural (archaeologically sterile) or archaeological layers, as stratigraphic units that delineated archaeological content and gave it chronological and cultural value. Original stratigraphic sequences at sites were rearranged into sequences of strata, which gave archaeological remains a new stratum context.

The potential effects of the use of arbitrary excavation are clearly visible in Ciganska jama (Caverna degli Zingari), a very important site for the prehistory of the Karst.[27] If we compare written and graphic descriptions of the stratigraphic sequence of the cave deposits (Marzolini 1971-1972, 58-59) we find that with individual spits, the excavators removed several stratigraphic units together (*Fig. 2*). With spits 7 and 6 they excavated at least four different layers, and with spit 5, even if we do not take into account all the lenticular whitish and blackish layers, they cut into at least five different layers. Among these are also those that extend deeper and were excavated with the 6th spit, and those that were raised and partially lay higher, so that parts had previously been removed with the 4th spit (Marzolini 1971-1972, 58-59, 99).

With the 5th spit, therefore, they excavated the remains of various layers, which means that finds from different periods were given the mark of this spit. A new context was determined for finds from various stratigraphic units, defined by the prevailing elements, diagnostic finds. The 5th spit became "Neolithic", and all finds excavated with this spit therefore became "Neolithic". Nevertheless, those finds that did not typologically correspond to the Neolithic, were separated from the Neolithic stratum on the basis of analytic typology, and placed in the *proper* context [28] (Gilli, Montagnari Kokelj 1994-1995, 116-117). The result is a series of artificial contexts that do not reflect the real state, so the data from this cave in my opinion cannot be used in solving archaeological problems. A similar finding applies also for other, equally well-known Mesolithic or Neolithic sites, e.g., Orehova pejca (Grotta dei Ciclami), Pečina na Leskovcu (excavations1982), Podmol near Repentabor, Ansa cave (Grotta dell'Ansa), Katrna pejca (Caverna Caterina), Pečina v Gmajni, Spodmol v Podpečini (Cavernetta della Trincea, Andreolotti, Stradi 1964), Trhlovca, Mala Triglavca and Acijev spodmol (see Fabec 2000, 41-60).

Data may be reliable from sites in which they came across only one archaeological layer, or where natural or, as termed in the literature, *archaeologically sterile* layers, lay between archaeological layers. With the use of the method of excavation with arbitrary spits, such sediments normally facilitate recognition of the original boundaries of layers and, in addition, simultaneously prevent one spit cutting into a number of layers with finds. We can therefore consider them to be "isolation belts" which sealed the archaeological context and, to some extent, prevented *proper* rearrangement of archaeological remains by strata contexts.

We only find the ideal situation, when an archaeological layer lies between natural ones, exceptionally in sites on the Karst. Mitreo cave (Stacul 1982, 28) is certainly one such site. G. Stacul excavated a test trench beside the cave wall and came upon a layer with Neolithic remains (layer 8), which lay partially on an archaeologically sterile layer of clay (layer 9) and partly against the cave wall. In the entire excavation area, layer 8 covered a 10 centimetre thick archaeologically sterile compact layer.[29] At the same time, it seems that Stacul was particularly attentive to stratigraphy and was well aware of its contextual importance (see also Radmilli 1978-1981; Stacul 1982; 1985-1987). For both these reasons, I believe that these data are usable in entirety. We also meet a similar situation in Jama v Malalanovem dolu (Cavernetta Malalan, Maselli Scotti 1981-1982).

In some cases, arbitrary spits, despite their "arbitrariness" can be treated as patterns of the contents of individual layers and as indicators of relative changes between archaeological remains at a site, and their value in such a case depends mainly on the form (horizontality) and thickness of the layers in the stratigraphic sequence. We meet such a situation, e.g., in Pajca na Sedlu. The cave deposit here was researched by the method

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[26] So tools is a Neolithic *packet*, a concept that determines that the appearance of pottery, domesticated plants and animals and polished tools is bound to a Neolithic content. These elements are assumed not to appear in pre-Neolithic layers, so in such cases they would be dealt with as infiltrates from upper layers (see e.g., Cremonesi 1984, 67; Cremonesi et al. 1984, 32; Cannarella, Pitti 1978-1981, 18).

[27] A very rich Neolithic layer was documented in the cave, immediately above a Mesolithic one (Marzolini 1971-1972, 99-101; Gilli, Montagnari Kokelj 1994-1995; Bon 1994-1995, 127). In the opinion of E. Gilli and E. Montagnari Kokelj (1994-1955, 115-116) there were no elements in the Neolithic layer that would indicate a continuation of an older tradition, and similarly no pottery that could be comparable with that from the culture of impressed cardium pottery or that from the phase of monochrome pottery.

[28] The dual character of stone tools from the fifth, Neolithic spit, long blades from alochthonous chert on the one hand and small tools with lower quality local chert on the other (Gilli, Montagnari Kokelj 1994-1995, 66-96), E Gilli and E. Montagnari Kokelj ascribe to different Mesolithic or Neolithic contexts. In other words, they took them for residual finds that had entered this spit because of post-deposional processes (ib., 116).

[29] It is not clear whether this is an anthropogenic or natural layer. It would certainly appear to be more likely to be the second possibility, where the layer would have been created mainly because of decalcification of the bedrock on the ceiling (Stacul 1971-1972, 37).

of arbitrary spits, which presupposes in the starting point the previously mentioned difficulties in determining the contexts of the archaeological remains. In Pejca, nine arbitrary spits were excavated, and in the upper two, fragments of Bronze Age and more recent pottery were found. A few fragments of pottery found in the lower part of the second spit may have been Neolithic. The remains from the lower spits (3-8) are Mesolithic (Andreolotti, Gerdol 1972, 62; Riedel 1975, 138-141). All the finds were presented by spits and not be stratigraphic units, but the latter can be identified on the basis of a description of the layers and mainly the graphic illustration of the cave stratigraphy, and their shape can also partially be established. The layers were fairly horizontal, because of which in some cases they did not cut into deposits of different layers at the same time during stratum excavation, which applies especially for the seventh, sixth, fourth and perhaps also the third spit (*Fig. 3*).

It can be seen that the boundaries of the two deepest spits followed the natural boundaries of two layers. On the basis of comparison of written and graphic data on stratigraphy, it would therefore be possible to establish that the excavators excavated the major part of a single layer with the seventh and sixth spits, and its upper part was removed with the fifth spit. The same would also apply for the third spit. In such a case, when only part of a single layer was excavated with a spit, the stratum context cannot be equated with the stratigraphic. Despite its artificiality, such a situation does not presuppose total excavation and therefore the mixing of archaeological remains from various stratigraphic contexts. If by its nature archaeology is confronted mainly with sampling, then the archaeological record in such a specific stratum framework as represented, e.g., by spits 7, 6, 4 and 3 is only a sample of some more relevant sample that the stratigraphic context (individual layer) gives. In this sense, data from these spits is only part of a context that is not artificial but primary, and such data function as a more difficult to interpret and less representative sample. Much the same could be said of Pečina Podkičer (Cavernetta ad Est di Trebiciano), Jama v Zavodu (Grotta della Tartaruga, Cremonesi's excavations) and Stenašca (excavated in the 70s) (Fabec 2000, 44-48, 59-60).

There are not many cases in which researchers followed the natural forms of stratigraphic units during excavation and determined the archaeological content on the bases of these. The reason for this lies in the historical development of archaeological methods of excavation, or in the fact that the stratigraphc method of excavation only began to be introduced fairly late. I have not found cases in which the archaeological content was researched and documented by the method of stratigraphic excavation. In some cases, e.g., in Stenašca and in Podmol near Kastelec and perhaps also in Pečina na Leskovcu (excavations 1958-1963), it can be seen that stratigraphic contexts determined the archaeological remains (Fabec 2000, 41-43, 59-61).

In Stenašca, during excavations in the 70s, they cut into the deposits with arbitrarily determined spits and excavated archaeological remains from the Mesolithic onwards. Even from the 90s onwards, despite being aware of the importance of stratigraphic context, layers were still being excavated with spits (Biagi, Starnini, Voytek 1993, 61; Spataro 1997-1998, 66), but this was only the method of excavation, it appears that documentation of finds followed the stratigraphic context (Boschin, Riedel 2000, 74). The conceptual approach to excavation was therefore stratigraphic: finds were no longer rearranged according to what was proper or improper, or in a case that specific elements were in the "wrong" context, they tried to give some reason for this, which was not necessarily connected with infiltration or residuality.[30] It can be seen, too, that they took into account the natural boundaries of layers, which, e.g., applies for Late Mesolithic layer 3a, which can be nicely distinguished from other layers (Spataro 1997-1998, 66).

Something similar also occurred in Podmol near Kastelec. Excavations in Podmol took place at a time when identification of stratigraphic units or contexts had become one of the basic aims of archaeological excavation at least in part of Slovene archaeology.[31] At this site, the method of excavation was still based on the excavation of arbitrary spits of arbitrary thickness, which were correlated during later processing of material with layers that had been documented in cross-sections (Turk et al. 1993, 46-47, Fig. 7). Because of this, all finds do not have a clear stratigraphic context, since finds (mainly fragments of pottery and stone and bone artefacts) are presented by groups (A-M). These groups, which are only roughly coincident with layers, are artificial contexts, which archaeologists in this case constructed on the basis of diagnostic finds because they believed that there were *too few* finds for the production of stratigraphic sequences (ib., 56). It is not therefore surprising that they put together in one group finds from various layers, or their parts. Data from artificial contexts, in my opinion, cannot be taken into account in attempts to explain neolithisation processes. For this purpose, other data seem to me to be usable, mainly those which were established by direct taking of samples from identified layers in a cross-section (sedimentological, pedological and pollen analyses) (ib., 47), and those for which the stratigraphic context is clear (see also Budja 1996a).

Researchers certainly came across Neolithic and (or) Mesolithic remains in numerous other locations. In these cases, unfortunately, there are extremely modest notes so that the determination of what was excavated as Neolithic or Mesolithic is extremely dubious. Since these data have not yet been verified today, we can only presume that the researchers came across Neolithic and (or) Mesolithic remains in the cave Grotta Gialla (Benussi 1964; Cannarella 1975-1977, 87-88; Batović 1973, 64), the caves Grotta del Bersaglio militare (Cannarella 1975-1977, 92), Jazbina pri Kačičah (Harej 1989, 206), Bestaževca (Saksida, Turk 1988), Jelenca jama (Marchesetti 1879), Jama v Sokolaku (Leben 1959, 242), Pečina v Sapendolu (Leben 1959, 242), Štefakova pečina (Moser 1899, 117), Tominčeva jama (Battaglia 1960; Leben 1959), Pečina (Moser 1899, 36,117), Golobinka (Grotta Romana presso Sgonico, Cannarella 1975-1977, 85), Kodramova pečina (Caverna sul monte Vides, Leben 1967, 55; Cannarella 1975-1977, 86), Sirkova pečina (Caverna a Nord di Santa Croce, Cannarella 1975-1977, 86), Žburlovca (Grotta della Finestra, Moser 1899, 117), Podganja jama (Moser 1910, 378), Žirka pečina (Grotta Tripoli, Leben 1967, 62-63; Cannarella

[30] So, e.g., they interpreted fragments of pottery in layer 3a (Mesolithic context) as evidence of the use of pottery on the part of Late Mesolithic groups (Biagi, Starnini, Voytek 1993, 61), and remains of domesticated animals as evidence of contact between Mesolithic and Neolithic populations (Boschin, Riedel 2000, 84).

[31] From the end of the eighties, some archaeological institutions in Slovenia, among which in particular the Slovene Archaeological Society and the Department of Archaeology of the Faculty of Philosophy, began to propagate the method of stratigraphic excavation and the importance of archaeological stratigraphy in the interpretation of archaeological remains. At that time, Harris's manual *Principles of Archaeological Stratigraphy* was translated into Slovene and the results of various sites excavated by this method. Soon thereafter, the *Department of Archaeology* of the Faculty of Philosophy included a cycle of lectures on archaeological methodology covering several years in the education programme, in which the principles of archaeological stratigraphy were one of the main themes of lectures.

1975-1977, 70), Jama pri Korinčevih (Leben 1959, 243-244), Pečina pod Medvejkom (Velušček et al. 1998, 103) and Rožice (Moser 1893, 68). We cannot say much more about these sites, since the remains found here and their stratigraphic contexts are unknown.

It therefore follows from the aforementioned that only few archaeological data from Mesolithic and Neolithic sites on the Karst have the kind of stratigraphic context within which one could observe records of processes that led past communities into new Neolithic circumstances. Archaeological data only have such contexts in Mitreo cave (Stacul's excavation), Stenašca (excavation in the 90s) and Jama v Malalanovem dolu, where unfortunately there were very few archaeological remains. Only part of the archaeological data from Podmol near Kastelec has stratigraphic context justifying the use of these data in explaining neolithisation. It can be seen that during excavations in 1958-1963 in Pečina na Leskovcu, stratigraphic contexts were retained in classifying finds (Fabec 2000, 41-43), so it is possible to read into the then documented archaeological remains traces of the transition to the Neolithic. Some data from Pejca na Sedlu, Pečina Podkičer, Jama v Zavodu (Cremonesi's excavation) and from Stenašča (excavations in the 70s) can be treated as truncated samples of archaeological remains and they reflect changes on a rough and wider scale. Perhaps the group of archaeological remains from Pečina pod Steno (only the 1992 excavations) and Lonza cave (Grotta Benedetto Lonza, only the 1980-1982 excavations) is defined on the basis of stratigraphic contexts, because of which they should not be written off as unusable (ib., 43-44). Archaeological data from other sites, for the aforemetnioned reasons, cannot be respected in explaining processes of transition to the Neolithic, so I will not take into account data from these sites in my view of the neolithisation of the Karst. Of these sites, it can perhaps only be said that at some time man left material traces in them.

Deposits in caves on the Karst: questions of the use of caves

In order to understand archaeological remains in caves, objects characterised by very complex dynamics of natural and anthropogenic processes, it seems to me important to recognise and understand these processes. It is possible to understand archaeological remains in caves better when answers to the question of how cave sediments are created, and above all what man used the cave for, are at least partially clarified. Such clarifications also seem to me relevant because they draw attention to the reasons for which similar caves, with a similar location of the entrance on the floor of a swallow hole, with similarly inclination of the ground and similar size of entrance, can have completely different characteristics in the sedimentation. The thickness of the Holocene layers in Podmol near Kastelec amounted for example to some 7 m (Turk et al. 1993), in Podmol near Vižovlje (Riparo di Visogliano) the Pleistocene layers lay right below the surface (Cattani et al. 1991). In Katrna pejca, in one part of the cave they came across layers in which Mesolithic remains were found, in another part, not far from the first, there were no such layers (Cannarella, Pitti 1978-1981). Such situations cannot, of course, be explained only as a result of human interventions in the space, although these can be very relevant (e.g., Cannarella, Cremonesi 1967, 301-308; Stacul 1982; Radmilli 1978-1981; Cannarella 1975-1977, 88; Gherlizza, Halupca 1988; Turk et al. 1993, 56).

Cave sediments on the Karst

The results of geological and sedimentological research of deposits that fill caves on the Karst have not yet provided sufficient valid models by which cave sediments can be interpreted with greater certainty. It can be seen that the creation, form and structure of these sediments are very locally and microlocally conditioned, so that it is sometimes a matter of real original "local history". Nevertheless, it is clear that it is only possible today to speak of typical (or ideal) stratigraphic sequences[32] of cave sediments (Andreolotti 1969, 83-84; Gospodarič 1980; 1984; 1985; D'Ambrosi, Legnani 1965; Radmilli 1984a).

From detailed sedimentological data from pre-Mesolithic layers of Stenašca (Boschian, Pitti 1984), Katrna pejca (Cannarella, Pitti 1984), Lonza cave (Meluzzi et al. 1984) and Pečina na Leskovcu (Cremonesi et al. 1984)[33] it follows that there was a great deal of rubble with stones of large dimension in these caves, below layers with Mesolithic remains. These are elements created by the mechanical disintegration of the ceiling and walls of a cave as a result of the action of freezing. Layers in which there was a great deal of rubble are interrupted by layers of sediments of fine fractions with few stones. These sediments are formed by silcate minerals and they can be classified into the group of pedogenicised alochthonous light soils. They are primarily deposited on the surface outside caves, and laid down in caves because of erosion activity (Cannarella, Pitti 1984, 136; Meluzzi et al. 1984, 119-120; Boschian 1996, 384; 1998, 121).

The characteristics of deposits[34] in which Mesolithic remains have been found are relatively well known (Boschian, Pitti 1984, 144-151; Boschian 1998, 121; Cannarella, Pitti 1984, 131-136; Cremonesi et al. 1984, 21-26; Meluzzi et al. 1984, 112-120). It appears that the main processes that created these sediments differ only slightly from those of the Late Glacial. The presence of a consistent share of limestone rubble in the early Holocene sediments could then be understood as a result no longer of a cold but mainly a damp climate (Boschian 1996, 384; 1998, 121). In contrast to older sediments, they are most characterised by strong anthropogenicity as a result of man's activities in caves. In addition to silicate materials, which entered the caves because of erosion, limestone components are present in the sediments, formed by micrite elements of regular shape and which can therefore be understood as ash of woody plants (Boschian 1998, 122; Courty, Wattez 1987). The amount of ash in sites greatly differs, also in relation to the position within a site itself. In addition, in layers with Mesolithic remains, it is possible to observe amorphous pieces of organic substances and numerous, often charred, macroscopic pieces of bone and flakes of chert (Boschian 1998, 121-122).

Deposits with Neolithic and Eneolithic remains contain few silicate minerals, which means that there is no longer so much alochthonous sediment. These sediments can be divided into two types. Apparently older sediments are characteristic of

[32] I stress that these are presumed typical sequences. Because of local conditionality of cave sedimentation it would be entirely justifiable to doubt whether the search for typical stratigraphic sequences is at all sensible.

[33] Late Pleistocene archaeological remains have not (yet) been found on the Karst. The exception, despite the dubious interpretation of the finds, may only be Ozka špilja. It is certainly necessary to draw attention that only in some caves have test soundings also been taken below levels with Mesolithic remains (so, for example, in Pečina na Leskovcu, Stenašca, and Lonza cave) and that in Lonza cave they reached the cave floor.

[34] These are data collected in Pečina na Leskovcu (excavated 1958-1966 and 1982), Stenašca (1969-1975 and 1991-1998), Katrna pejca (1975) and Lonza cave (1975-1981, only from the layer with Mesolithic remains).

the first type, in which alternating white, black and light brown, sometimes only a centimeter thick layers lie more or less densely and continuously. These layers can be horizontal, in cross section they often have the form of an arc so that they are reminiscent of real "heaps" of material. The share of calcium in the thinnest fractions can reach 60%, and it is also possible to observe in the layers calcite, circular stones of a diameter of 10 to 30 mm, which are formed in the small intestine of ruminants (kine) and which the animals excrete. Black layers contain a lot of fragments of charcoal and traces of plant structures belonging predominantly to grasses (*Graminaceae*). The mentioned structures normally appear in groups that have roughly the shape of excrement of ruminants.

The second type of deposit is formed by homogenous, sometimes muddy sediments of browny yellow colour with little rubble, which is chaotically scattered. Among the fine fractions, the share of carbonates is from 15 to 25%, for the most part formed by calcite circular stones and very numerous phytolites from hydrated silicous oxides, which are the inorganic remains of plant structures, for example grasses (*Graminaceae*). The homogeneity of layers is interrupted by 1 to 5 cm thick lenticular layers with charcoal, covering large areas.

The two types of deposits can appear together, but the first type of sediment is often located close to the walls and the second is often in the central part of the cave. The sequence of white-red-brown layers normally lies directly above Mesolithic layers and often on an eroded area of deposits with Mesolithic finds. These forms are probably linked more to a specific activity in a specific place, rather than being a chronological indicator (Cremonesi et al. 1984, 22; Boschian 1996, 385; 1998, 122).

On the basis of the data presented above, G. Boschian (1996 and 1998) tried to establish a model that would reflect the leading characteristics of Post-glacial and Early and Middle Holocene processes that created cave deposits. The main process that formed cave sediments in the Late Glacial and Early Holocene (Preboreal and Boreal) was erosion of soils that had been formed on older light soils on the surface outside caves and which caused deposition of the eroded sediments in the cave. Powerful erosion was probably the result of sparse vegetation (Boschian 1996, 384-385; 1998, 123). In this time interval, there is a marked tendency for gradual climate improvement, which is reflected in the reduced effect of freezing on sedimentation. There is no trace of serious cold phases, which may have been a result of the encroaching Adriatic Sea.

A characteristic of post-Mesolithic phases of sedimentation is the almost complete absence of alochthonous detritus, and a large number of anthropogenic elements appearing in sediments. This situation can probably be linked to the Atlantic phase of the growth of forests, which covered the slopes and reduced the power of erosion (Boschian 1996, 384-385; 1998, 123).

On the basis of pedological sedimentological research of the Holocene sediments of Podmol near Kastelec, T. Prus (Turk et al. 1993) offered a slightly different interpretation of the creation of Holocene sediments in Podmol. The surprising thickness of these sediments in his opinion is a result of two factors: firstly because of powerful erosion, which carried earth into the cave, and secondly, because of anthropogenic factors. The erosion force was not apparently water but mainly wind, which created real soil "drifts" in exposed parts of the valley in Podmol. His model, too, presupposes open surfaces amd at the same time draws attention to the possible existence of primitive agriculture (similar to so-called "*slash-and-burn*" farming) already in the Neolithic phase of settlement of Podmol, since layers with Neolithic finds embrace a good half of the thickness of the entire Holocene deposits. Because of such a system of management, abandoned open surfaces would be continuously created, which were a powerful source of erosion material (Turk et al. 1993, 56).

Use of caves in the Mesolithic and Neolithic

Debates about the human use of caves in the Mesolithic and Neolithic can be traced parallel to discussions on the neolithisation of the Karst. C. Marchesetti suspected that mankind lived constantly in caves in prehistory, perhaps because they offered protection from wild animals and bad weather (Marchesetti 1890). J. Korošec believed quite otherwise. In his opinion, cave sites do not reflect real settlement, since he finds that "... questions of dwelling problems and also questions of settlements can only be solved with finds of open settlements in open spaces ... and not in connection with caves, which are today fairly dubious in relation to their use as dwelling objects ...". Archaeological remains in caves are assumed not to be *in situ*, but carried into the cave from the space in front of it by water (Korošec 1960, 6-7, 29, op. 13). D. Cannarella had a similar opinion, finding that caves did not serve as real dwellings in the Neolithic but that people only occasionally visited them, mainly as emergency shelters (Cannarella 1975-1977, 51; 1999, 69), and perhaps also for cult and funeral needs (Radmilli 1987). By definition, members of the *Vlaška* group would have lived in caves that opened onto the floor of dolinas already then cultuvated for agriculture. This was demonstrable mainly by impressions of structures woven with branches found at the start of the last century in Pejca na Doleh (Barfield 1972, 201, who cites Moser 1903b). J. Müller on the basis of the high percentage value of remains of domestic animals in Early Neolithic cave contexts in the East Adriatic suspects that caves served as pastoral outposts (Müller 1994, 46, 64-69). Odmut cave would be an exception, in which the share of remains of domestic animals is very low, and the cave would therefore have been used mainly by hunters (ib., 201-203, 327). In both cases they were certainly seasonal camps of travelling groups that were not bound to arable cultivation (ib., 62-64). There is not supposed to be any doubt that Mesolithic communities used caves as permanent dwellings (Cannarella 1999, 72).

It is certainly necessary to stress that none of the cited reasons has a firm basis. Korošec's suspicion that Neoltihic remains were carried into caves by water (Korošec 1960, 6-7) and that the finds do not therefore prove human use of caves can today be rejected mainly on the basis of sedimentological and micromorphological analysis of sediments (Boschian 1998, 122). It is also difficult to believe A. M. Radmilli (1987), since remains of ritual and funeral activities in caves are found only exceptionally and in unclear contexts (see also Carpani 1999). D. Cannarella constructs his assumption on the basis of "... discontinuity of settlement", which unfortunately he does not prove, merely claims that from the Neolithic onwards inhabitants of nearby settlements occasionally visited caves for purposes that have not yet been discovered (Cannarella 1975-1977, 51). Barfield's explanation also seems to me unfounded, since his main argument connected with traces of constructions Pejca na Doleh, cannot be confirmed because of the dubious credibility of Moser's excavations. I could find no mention of data on possible traces of constructions in layers from Mesolithic or Neolithic finds. The presumption of cultivation activities on the Karst before the Eneolithic also remains unconfirmed (Budja 1996b, 68). That caves functioned in the Mesolithc as permanent dwellings (Cannarella 1999, 72) is also far from proved. It can be seen, namely, that Mesolithic communities in the Northern Adriatic were very mobile (Miracle 1997) and that at least some of the Mesolithic archaeological remains do not suggest permanent settlement of caves (Montagnari Kokelj 1984, 226; Biagi, Starnini, Voytek 1993).

In contrast to the aforementioned explanations, that offered by Boschian (1996; 1998) has a clear advantage on the level of data. On the basis of sedimentological and micromorphological analysis of sediments, it can be seen that Mesolithic communities used caves intensively, above all they burnt a great deal of wood

in caves (Boschian 1998, 123). From the Neolithic onwards, mankind began to use caves mainly for the needs of pasturage. The typical alternating white, black and light brown thin layers that we come across above layers with Mesolithic finds in numerous caves on the Karst (Boschian, Pitti 1984, 150), namely, are comparable with deposits from caves in the south of France and in Arene Candide cave in Liguria, which was used from the Middle Neolithic onwards as a temporary pen for kine and cattle (Courty, Macphail, Wattez 1992). Shepherds would have used these caves in a system of transhumance pasturage almost exclusively as stables, and the white-black layers would thus have been created because of the deliberate burning of litter at the end of its use. The white-red-brown layers normally lie in the form of "heaps" so it is possible that the shepherds rearranged the interior of the caves several times and made a heap of the remains of litter. Use of the cave as a pen for animals is also confirmed by the small number of remains of material culture in them, meaning that the caves in such cases had not served for living purposes (Boschian 1998, 123-124; 2000).

Boschian's explanations have been accepted in archaeology (Cannarella 1998; 1999; Montagnari Kokelj et al. 1996), and here I would like to draw attention to the possibility that the start of use of caves as pens is not connected to the Neolithic. In Stenašca, the thin white lenticular carbonate layers above thin black bands already begin to appear in the upper part of Mesolithic deposits (Boschian, Pitti 1984, 150, t. 2a). In a series of thin lenticular carbonate layers "underlined" by black bands, they also came across the upper part of Mesolithic deposits in Pečina na Leskovcu (Cannarella, Cremonesi 1967, 286; Cremonesi et al. 1984, 21-22, 26, t. 2). There were similar layers in Mesoltihic deposits in Lonza cave (Meluzzi et al. 1984, 116-118, 120, t. 1). In Katrna pejca, white lenticular carbonate layers similarly lay above thin black bands in the upper part of Mesolithic deposits (Cannarella, Pitti 1984, 136). They may also have found a similar situation in Ciganska jama (Marzolini 1971-1972, 99). These cases perhaps show that Late Mesolithic communities already used some caves as pens.

The inclusion of the rearing of domestic animals in the basic economy of Late Mesolithic communities is also confirmed by archaeozoological studies. In the Late Mesolithic layer 3a in Stenašca, the share of remains of kine and domestic cattle is surprisingly high (Boschin, Riedel 2000, 75, 78-84). Kine and domestic cattle are also represented in the Mesolithic deposits of Pejca na Sedlu (Riedel 1975, 138-141). Remains of kine were perhaps also found in Mesolithic deposits in Pečina na Leskovcu (Cremonesi et al. 1984, 28-36). In Podmol near Kastelec the remains of kine were perhaps found in "pre-Neolithic layers" (Turk et al. 1993, 72; Budja 1996a; Velušček 1997). Remains of kine, domestic cattle and domestic swine were also perhaps found in Mala Triglavca (Budja 1996b, 66).

An additional argument confirming the use of caves as pens can be seen in the great deal more recent tradition of walled constructions which close off the entrance to caves. K. Moser, e.g., already documented such walls in Pejca v Lascu (1899, 55). Cases of the entrances to caves being walled off are not lacking; let me mention only Ciganska jama (Marzolini 1971-1972), Škuretova jama, Leša pečina, Katrna pejca, Sirkova pečina, Jama na Pavljem vrhu (Gherlizza, Halupca 1988, 52, 57, 59-60, 116, 167) and Podmol near Kastelec (Turk et al. 1993, 47). When man built these barriers is unknown, with the exception of Pečina pod Muzarji, in which the oldest walls are already documented in late pre-history (Guacci 1959). Certainly in easily accessible caves, shepherds still enclosed herds of kine recently.

However, all caves did not serve only as pens. This is testified by the fact that an exceptionally large quantity of remains of material culture have been found in some caves, particularly Pečina pod Steno (Gilli, Montagnari Kokelj 1993), Pejca v Zavodu (Cannarella, Redivo 1978-1981) and Orehova pejca (Gilli, Montagnari Kokelj 1992). It is interesting that the above mentioned white-black-red layers were not found in any of these caves (Gherlizza, Halupca 1988, 98; Cannarella, Redivo 1978-1981, 47; Legnani 1967).

The reasons for Mesolithic hunter-gatherer groups using caves also remain unexplained. G. Boschian showed that Mesolithic groups used caves intensively but he did not offer any explanation of why (Boschian 1998, 123). Müller suspects that they used caves as hunting outposts or *kill sites* (Müller 1994, 65-67). L. R. Binford found in relation to kill sites that "anatomic parts of high general use are represented with low frequency, while low use parts appear with high frequency" (Binford 1978, 77-81). That such remains are not merely a result of taphonomic processes has also been shown by other studies (e.g., Legge, Rowley-Conwy 1988). The amount of Mesolithic archaeological remains in caves on the Karst is small, but they include is a great deal of remains of game animals. It is significant that among the bone remains, the most frequent are bones of anatomic parts that do not have a lot of meat, or are low use, as is well seen in *Figure 5*.

It is possible, therefore, to assume that Mesolithic groups used caves as kill sites. The numerous remains of sea molluscs in Mesolithic deposits does not undermine this assumption, since perhaps this source of food can also be understood in the context of hunting activities of mobile Mesolithic groups (Miracle 1997, 55), mainly because sea molluscs can be kept "fresh" even when they have been out of the water for several days (Ortea 1986).

PALEOLANDSCAPE OF THE KARST AT THE TIME OF THE EARLY AND MIDDLE HOLOCENE

Climate

Climate is a variable which sometimes more subtly and sometimes very clearly influences the evolution of a landscape and relations between people and the environment (Mlekuž 2000, 39). Good indirect climatic data amd reconstructions of the palaeoclimate of the Karst is not yet available, the only attempts at reconstruction in this direction have been carried out on the basis of granulometric and structural analysis of cave sediments (Legnani 1967, 80-82; Meluzzi et al. 1984, 119-120). Unfortunately, the results of these analyses are of low separability and are very badly dated specifically, since they were normally directly linked to "already known" oscillations of cold and warm periods in the Pleistocene and Holocene and were also used for dating archaeological and geological records. I am therefore providing a picture of the dynamics of palaeoclimate on a supraregional scale, summarised from D. Mlekuž (Mlekuž 2000, 39-45).[35]

After a quick warming at the end of the Dryassic, a period of a trend of moderate warming followed, which was interrupted by short coolings, that appear as oscillations of the forest line in the Alps. Warming lasted until around 8900 cal. B.P., when the first signs of cooling are recorded, which continued right

[35] On the basis of data from ice records GISP2 (Stuvier, Braziunas, Grootes 1995; Grootes, Stuvier 1997), analyis of the balances of the surfaces of lakes (Yu, Harrison 1995), the dynamics of Alpine glaciers (Röthlisberger et al. 1980; Gamper, Suter 1982; Hormes, Schlüchter, Stocker 1998; Nicolussi, Patzel 2000) and local climatic records from the Ljubljansko barje, D. Mlekuž tried to reconstruct the climate on a supraregional scale, which would demonstrate mainly long-term climatic rhythms. I believe that this picture could at least partially also apply for the Karst.

up to the end of the 9th millennium B.P. (8400-8200 cal. B.P.). This was also the most intensive cooling event in the Holocene. It was followed by a period of regionalisation of climate, when short-term climatic oscillations also included very wet years, with perhaps more than 50% more average precipitation than today. There was a fresh cooling in the eighth millennium, which lasted until 7100 cal. B.P., when the average quantity of precipitation was reduced, and because of the rise in temperature, evapotranspiration also increased. Between 6000 cal. B.P. and 5200 cal. B.P. there was a cold phase in the Alps, which was followed by a period of ever drier and warmer climate to around 4200 cal. B.P. with some intermediate cold events, among which the strongest happened around 4600 cal. B.C.. Data show that some events were of high amplitude and only lasted a few decades.

Vegetation

The Karst has not been subject to very many palaeovegetation studies and the few studies in this direction have given fairly modest data relevant to the theme of this task.

Only four points are known on the entire Karst where sampling of paleovegetation remains has been carried out, and only part of this was directed at an attempt to reconstruct the natural landscape and ascertain the human impact on the environment.

One of these points is the swampy basin, Vodenjak near Podgorje (Podgorski Karst). A borehole here to a depth of 365 cm reached baserock. A sample from a depth of 195 cm was radiocarbon dated to 2495 ± 100 BP (Z-2543). Approximate evaluations of the vegetation only gave us spectra from a depth of 160 cm upwards, since deeper spectra were extremely poor in pollen (Culiberg 1994, 204-205). Because of this, and also because of the suspicion that this record does not go back to the period that is the theme of this task, data from this borehole is of very little use to us.

In 1998, under the leadership of M. Budja (Department of Archaeology of the Faculty of Philsophy in Ljubljana) a borehole was drilled on the floor of a large swallowhole by Kozina. A depth of more than 10 m was reached, but the borehole did not give the desired results, since pollen had not been preserved because the soil was too dry (M. Andrič pers. comm.).

M. Culiberg tried to reconstruct the natural landscape of the Karst with palinological data from a borehole in Škocjanski zatok by Koper and to discover the human impact on the environment, and Budja (1996b, 67) included her results in the debate on the neolithisation of the Karst. In his opinion, the pollen diagram from this borehole shows the vegetation in the time period starting around 7000 years ago. She found that the strongest forest formation then was oak-hornbeam (*Querco-Carpinetum)*, together with hop hornbeam (*Ostrya*) and beech (*Fagus*). Lime (*Tilia*) and elm (*Ulmus*) were throughout poorly represented, but constantly present. The occasional unusually high values of hazel (*Corylus*) would signify thinning of the forest for grazing, already from the Neolithic onwards. At the same time, the values of oak fluctuated unusually strongly, which may have been a result of cutting green branches for winter fodder. The pollen of wild vine (*Vitis*) was found in Neolithic layers. The first appearance of pollen of wheat is documented in a section from the time after the mid fourth millennium, and agriculture intensively developed later, in the Roman period. In the Neolithic and older layers, members of the goosefoot family (*Chenopodiaceae*) are strongly represented (Culiberg 1994, 204,207). The question I raise is whether the pollen diagram from Škocjanski zatok really shows the natural landscape and anthropogenic changes in it on the Karst. It seems to me more probable that the original area of the pollen in these sediments is connected to the space below the Karst rim: pollen in this borehole for the most part belongs to plants that grew beside rivers and streams flowing into Škocjanski zatok, so more from the region below the rim of the Karst, rather than the Karst itself. The second problem is also the location itself of the borehole in the vicinity of the sea. If the presumption that the sea in the early Holocene underwent a number of phases of regression and transgression is accurate (Ogorelec et al. 1997), then in the case of a mixing of fresh and salt water in the bay, the area of origin of the pollen would be much greater, even the hinterland of the Bay of Trieste and the river banks of all the rivers that flow into it.

Samples for palaeovegetational research were also taken from cross-sections of test soundings in Orehova pejca, Acijev spodmol and Podmol near Kastelec. In contrast to lakes, where pollen is normally well mixed and evenly distributed, the distribution of captured pollen in a cave can be unbalanced and uneven, becase of which a small number of counted pollen grains can show a deceptive vegetation picture, since the presence or absence of one or two pollen grains may be coincidental (Jacobsen, Bradshaw 1980).

In Orehova pejca samples were collected at 20 cm depth intervals and only the pollen of birch (*Betula*), pine (*Pinus*), fir (*Picea*), beech (*Fagus*), hazel (*Corylus*) and the main components of mixed oak forest (*Quercetum mixtum*, community of oak, lime and birch) were treated in the analysis. There was no pollen in Pleistocene clays, probably because the cave was then still closed. Its entrance would only have been created with the collapse of the ceiling towards the end of the Würmian glacial. The oldest pollen remains suggest the strong presence of birch and prevailing pine; birch would have remained here as a relict from the Late Glacial. The small amount of pollen could be evidence of a relative scarcity of trees in that period, and thus of an open landscape with few forests (subarctic type of forest). In the Pre-Boreal, the share of pine and birch falls, and spruce appears. Subsequently, in the Boreal, together with the mentioned species, beech and hazel become strongly established, achieving the highest measurements in this phase, while the beginning of the phase of mixed oak forest already appears. This predominates in all upper samples (Atlantic), in which in the Sub-Boreal the pollen of spruce and beech will also occasionally appear (Legnani 1967, 83-85).

The cave entrance, which opens onto a fairly gently sloping world oriented towards the north, was relatively small at the start of excavations (3.50 x 2.20 m) and probably smaller than in the Early Holocene. Nevertheless, its size was far from what would have allowed the deposition of regional pollen in the cave (see Mlekuž 2000, 45). I believe, therefore, that the pollen record from this cave reflects the local vegetation and thus reduces the value of Legnani's model of the development of forests on the Karst.[36]

Analyses of macroscopic (charcoal, seeds) and microscopic

[36] On the basis of these pollen diagrams, which he compared with others in neighbouring regions, Legnani (1967) tried to define in framework the main trends in the development of climate and tree associations on the Karst. So in his opinion, pine predominated in the early Preboreal, which was joined in the late Preboreal by spruce. In the Boreal, in connection with raised temperatures, a continental climate appeared. Hazel then achieved the greatest spread. While in the Friuli lowlands and by the coast mixed oak forest predominated, on the Karst plateau, beech predominated. Mixed oak forest achieved its maximum distribution in the Atlantic period, at a time characterised by a typical post-glacial oceanic climate. In the Sub-boreal, the share of beech and spruce again increased, which indicates a shift to a more continental climate. In the Sub-atlantic, mixed oak forest, beech and fir stabilised at different altitude belts (Legnani 1967, 87-93).

(pollen) plant remains were performed in Acijev spodmol and above all Podmol near Kastelec on the basis of samples collected in the cross-section of test soundings. At the time of settlement of the two caves, the surroundings of the caves would have been covered with oak-hornbeam forest (*Querco Carpinetum*)[37] and typical pasture plants (rowan, dogwood, St Lucie cherry or blackthorn) (Turk et al. 1992, 34-35; 1993, 70). The pollen of fir (*Abies*) is strongly represented, but did not in the opinion of M. Culiberg grow in the near vicinity (Turk et al. 1993, 70). Pollen of pine (*Pinus*) is represented in all pollen diagrams to at least 5 to 10%, which would have been a result of the overgrowing of barren lands, which pine would have settled as a pioneer. In the lowest samples (samples 31-28), which were collected in sediments with the oldest Neolithic remains, pollen of pine was represented with the same share as that of spruce (*Picea*) and both are ahead of the pollen of fir (*Abies*). This pollen ratio differs completely from the tree relations shown by anthracotomic remains. The reasons for this would be mainly taphonomic. Oak (*Quercus*), ash (*Fraxinus*) and hop hornbeam (*Ostrya*) are represented. Of herbaceous plants, most pollen belongs to fern spor, and much less to the scabious family (*Dipsacaceae*), goosefoot family (*Chenopodiaceae*) and grasses (*Graminae*). This picture does not essentially change in the course of Holocene sedimentation of deposits in caves. The pollen of cereals (*Cerealia*) first appears only in layers with Eneolithic remains (ib., 70, t. 4).

On the basis of data from Acijev spodmol and above all Podmol near Kastelec, M. Culiberg concludes that these palaeovegetational remains reflect the type of vegetation that is not primary from the very start (Turk et al. 1992, 53; 1993, 70). The typical pasturage plants indicate this, as well as the extremely small quantity of pollen of grasses, which could be a result of intensive grazing that would have prevented grasses from flowering. The pollen of scabious, of which there is most in layers with archaeological remains, would have been brought into caves through excrement of animals herded into the dolina. The large share of pollen of fern spore highlights the possibility that humans used ferms for bedding (Turk et al. 1993, 70-71).

The size of the swallowhole into which Podmol near Kastelec opens, which does not exceed a diameter of 50 m, is small, so the pollen record shows the local vegetation record. It should not be overlooked that the presence of charcoal in the stratigraphic record of Podmol is connected with human activity, probably burning wood in hearths. Man may have used the type of wood for burning very selectively. Cut wood for this purpose is normally local, at most barely supra-local. The presence of such varied tree components in the record, therefore, cannot be linked to different regions of origin. Mainly the presence of fir appeared problematic in the record, for which in this case the answer may be sought in the location of the cave on the floor of a dolina, which would also give a different answer to the high share of pollen of ferns.[38] What is surprising is the great uniformity of vegetation remains throughout the period of settlement of Podmol, including the time when supra-regional climatic oscillations were very strong (Mlekuž 2000, 42-45).

It can thus be seen that vegetation in the vicinity of Podmol and Acijev spodmol, at least from the Neolithic onwards, already achieves a stage determined by factors which M. Culiberg calls "anthropozoogenic". The surroundings of Podmol were covered by a vegetation cover of light oak forest with interspersed open spaces, pastures and clearings (Turk et al. 1992, 34; 1993, 70-71). Perhaps examples of "cold" flora were preserved in valleys, which functioned as vegetation refuges in the post-glacial (Poldini 1989, 35). It therefore appears that such a vegetation cover, seen on a small scale, was fairly static over time, since there is no trace in the palaeovegetational record from Podmol, and perhaps also Acijev spodmol, of intensive disturbances that would have been caused by vegetation restructuring.

Indicators of fauna

Some researchers have used remains of fauna in the reconstruction of local and regional environment and regional vegetation (Cannarella, Cremonesi 1967; Cremonesi 1967; Meluzzi et al. 1984, 122-123; Petrucci 1996; Cannarella 1998). According to them, in the Early Holocene, the Karst was covered with a cold type of forest (presence of ibex) with clearings (xerophylous molluscs). On the floor of numerous holes (dolinas) with impermeable red clay, there would have been standing water or pools (presence of beaver, otter, freshwater fish, igrophylous molluscs). From the sixth millennium B.C. the former forests are thought to have been replaced by broadleaf forests with clearings (presence of red deer and roe deer and xerophylous molluscs). Water catchments are then thought to have dried up (share of freshwater fauna falls), and the sea reached the edge of the Karst (presence of sea molluscs, mainly Monodonta and limpets - Patellae). Because of the vicinity of the sea, the climate soon warmed up, the previous vegetation cover started gradually to be replaced by a Mediterranean type of vegetation with numerous clearings (red and roe deer still present, as well as small ruminants).

This simplified reconstruction of the palaeoenvironment is based on remains of fauna which for the most part derive from archaeological deposits and they were formed as a result of complex taphonomic processes (Lyman 1994). First of all, these remains are archaeological remains. The direct use of these data for such a reconstruction is therefore deceptive, mainly because they are culturally conditioned and are therefore unrepresentative in relation to the total fauna population of the territory. "Use" of game was probably conditioned by an understanding of edible - inedible, nutritious - less nutritious, prestigious - not prestigious, valuable - less valuable etc., which provided guidance in the deliberate and selective exploitation of animals. From this point of view, the original area of these "goods" may have been supra-regional and as such reflect a very deceptive picture of the state on a regional scale.

Since in no case do we have available in depth taphonomic analyses of animal remains, it is difficult to decide which remains are in fact connected with human needs and which were brought to the site as a result of natural processes. In addition to mammals, malacological remains are mainly problematic in this sense. If the remains of sea molluscs were certainly brought to caves by man, this cannot be claimed with certainty for other, continental species. The remains of these species could reflect the palaeovegetational and palaeoclimatic conditions of the entrance part of a cave and its surroundings, but unfortunately, because of a whole series of problems connected mainly with taphonomic

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[37] In this community, hornbeam predominated (*Carpinus orientalis*), which reduces the share of hop hornbeam (*Ostrya*). There is locally a very strong participation of holm oak (*Quercus ilex*) (Poldini 1989, 206-207). In Podmol, oak, ash, maple, hornbeam and also beech are represented (Turk et al. 1993, 70).

[38] An inverse stratigraphy of vegetation is characteristic of dolinas. The thermal gradient of dolinas is twelve times greater than on the surface. This gradient is an average measure that changes during the course of the year. This characteristic is of great importance, since it means a drop of 50 m in a dolina has the same impact on data as an increase of altitude of 600 m (Poldini 1989, 222).

processes, horizontal and slanting caves are the most problematic type of location for collecting malacological remains (Girod 1996).

Human interventions

Kathy Willis (1995) showed that the first evidence of agriculture in the Balkans and Anatolia on smaller scales[39] (landscapes) is almost 3000 C14 years later than records on larger scales (sites). The first major felling of forest, which appears in increased chemical and mechanical erosion, a radical reduction in tree species, increased share of herbiforous plants and the presence of indicators of arable farming, are only documented after 3000 BP (Willis 1994). Clearly human interventions were of low intensity, short in duration and limited in changing the structure of forests. Traces of forest use by hunter-gatherer communities are extremely difficult to interpret, but very probably hunter-gatherer communities encroached on forests with burning (e.g., Willis 1995, 21-22; Mlekuž 2000, 65-67 with citat.). No remains have been discovered on the Karst that would suggest one use or another of forest in the subsistence activities of hunter-gatherer communities.

A mass of models that interpret Early Neolithic interventions on forests, such as models of forest grazing (Vera 2000) and forest agriculture (Carugati, Castelletti, Rottoli 1996), stress the limited impact and short duration of these events, which are similarly difficult to interpret in vegetation remains. It therefore seems surprising that traces of the use of forest and encroachments on it can be observed on the Karst at least from the Neolithic onwards. They appear above all in the structure of the vegetation record and M. Culiberg explains them as a result of intensive grazing (Turk et al. 1993, 70-71). Such activities therefore probably started before the Neolithic, then continued and clearly became increasingly intensive (Poldini 1989), which is confirmed by both archaeological (Riedel 1975; Boschin, Riedel 2000) and sedimentological (Boschian 1996; 1998) research.

Dynamics of settlement of the Karst plateau

Even a very brief reading of this contribution makes it clear that all, or almost all Mesolithic and Neolithic remains known to data originate from caves. What are the value and significance of this finding? Why and how did such a record occur? There are various answers and all can be valid. I would only here like to draw attention to some aspects which seem to me very important in understanding neolithisation, perhaps even crucial. For a better understanding of the creation of the record of the settlement sample and its significance, I must again draw attention to the historical circumstances in which this sample was discovered.

The intensity of prehistoric research, mainly that of Mesolithic and Neolithic remains, depended, as I have shown, mainly on the intensity of speleological research, because it was largely cavers that carried it out. Until the Second World War, speleological research was focused mainly in the surroundings of Trieste and only partially directed also at more distance areas of the Karst. There were many reasons for this. Caving activities were greatly accelerated by the needs of the fast growing city of Trieste for water sources, which they sought in the underground (Galli 1999). There were thus many caving societies in Trieste, in contrast to other places, which competed among themselves in discovering caves - potential routes to water. Not least, exploration of further places was made more difficult by the lack of transport, which means that the areas explored were mainly those that could be reached by public transport. After the Second World War, the Karst was broken into different administrative units and the research area of all the Triestine caving societies was then concentrated on Trieste and only partially on the Gorizia Karst. A very intensive period of caving exploration began, which is still continuing, and more than 2800 caves have been discovered, of which almost 2500 are on the Triestine Karst. Among them, by 1988 almost 130 caves had been recorded as archaeological sites (Gherlizza, Halupca 1988). The Gorizian Karst was less well explored than the Triestine one, especially because caving in Gorizia only developed after the Second World War and mainly in the last thirty years (Deiuri 1991). On the Slovene or Yugoslav part of the Karst, caving was even less well developed, and there were incomparably fewer caving societies that could explore this area. The state of research of the Slovene part of the Karst today is thus only marginally better than at the end of the war. Fewer than 600 caves have been discovered on a territory at least twice as large as the Triestine Karst. The intensity and also the quality of research[40] was (and is) incomparable on the two sides of the border (Malečkar, Morel 1984; Šušteršič 1994), as can also be seen from Figure 1. The result of this qualitative dualism is clearly reflected in the Mesolithic and Neoltihic settlement sample. It would appear that only the coastal part of the Karst was then intensively exploited, as if the then communities did not reach the interior, mainly this side of the Slovene border. Such a settlement sample reflects contemporary social and geopolitical trends and not the dynamics of Mesolithic and Neolithic settlement.

I said that the Triestine Karst had been intensively researched. I therefore believe that the settlement sample from that area may be representative, despite the fact that it is probably conditioned by the local geomorphological situation, which differs in some respects from those of other parts of the Karst.

Settlement in caves and settlement in the open

On numerous occasions (e.g., Montagnari Kokelj 1993; Bagolini, Bressan 1994, 67; Budja 1996b; Biagi, Starnini 1997-1998) it has been said that Mesolithic and Neolithic remains on the Karst are connected exclusively with caves. Data is assumed to be partial because it does not also originate from sites in the open, which "... would certainly have been complementary to the cave course of the Mesolithic and perhaps even more important in the later Neolithic" (Montagnari Kokelj 1993, 76).

Such findings are perhaps less firm if some sites are treated as sites in the open. Podmol near Repentabor could belong to that category, where the archaeological layers are ranged on the floor of a dolina by the side of an overhanging cliff. Archaeological remains at this site show that Neolithic and perhaps also Mesolithic groups stayed at the location (Radmilli 1973-1974a; Montagnari Kokelj 1993, 79). Settlement of a similar location is also recorded in the vicinity of Nabrežina (Previs na Caharijevem Svetu, Riparo Zaccaria), where Mesolithic remains were similarly discovered by the side of an overhanging cliff on the floor of a dolina. This location, like that at Podmol near Repentabor, was also settled in the periods that followed the Mesolithic (Calza, Cannarella, Flego 1973-1974; Montagnari Kokelj 1993, 79; Cannarella 1978, 32; Stanislao Flego, pers.

[39] In pollen and sedimentological records outside sites (Willis 1995, 19-20).

[40] This applies both for speleological and archaeological research. As has been said, the intensity of archaeological research was connected mainly to groups of amateur archaeologists in the context of caving societies, of which there were incomparably fewer in the Gorizian and Slovene Karst than in Trieste.

comm.). Mesolithic traces were discovered in the open near Doberdobsko jezero (Lago di Doberdò, Cannarella 1978, 20), and perhaps the location by Rožice (Kozina) could also be put in this group of sites, where a lot of "Stone Age" stone artifacts were found by a pond towards the end of the 19th century (Moser 1893, 68). The decision to settle in these cases was not conditioned by caves, but nevertheless a connection between remains in caves and sites in the open can be observed.

What distinguished remains in caves from those in the open on the Karst? Is it justifiable on an interpretative level to divide types of settlement into cave and open? In terms of duration and intensity of settlement of one place, two types of settlement of a location could be distinguished: permanent (a settlement) and impermanent (a camp). Both have strong interpretative implications in terms of understanding neolithisation (see, e.g. Chapman, Müller 1990; Müller 1994), and both can exist both in the open and in caves (for example Predjamski grad by Postojna). The key question is therefore not connected with the microgeomorphological location of the remains, where sometimes it is difficult to decide whether they are in a cave or in front of it, or a record in relation to forms which are only with difficulty defined as cave or non-cave, but on the different strategies of use of locations in space. We still do not have firm evidence by which any of the Mesolithic or Neolithic remains on the Karst can be explained as permanent or seasonal use of a location.[41] Nevertheless, archaeological remains, normally because of their structure, were mainly treated in Mesolithic and Neoltihic sites as records of intensive short-term settlement (Cannarella 1968, 163-165; 1975-1977, 51) and episodes (Montagnari Kokelj et al. 1996, 229), which sedimentological studies today confirm (Boschian 1998). On the Karst, the structure of Mesolithic and Neolithic remains from outposts in caves and in the open is seen to be fairly similar on a larger scale[42] (Montagnari Kokelj 1996; Calza, Cannarella, Flego 1973-1973) and in both cases suggest a more *logistical* than *residential* (Binford 1982, 7-8) character of strategies of use of space.[43]

Basic economy and mobility[44]

The basic economy of Mesolithic communities on the Karst was hunting wild animals,[45] among which red deer (*Cervus elaphus*) is mainly represented, and somewhat less roe deer (*Capreolus capreolus*) and wild boar (*Sus scrofa*) (Cannarella, Cremonesi 1967; Riedel 1978-1981, 211; Cannarella 1978; 1998; Cremonesi, Pitti, Radmilli 1984a, 232-233; Montagnari Kokelj 1993, 78). The representation of other mammals in Early Mesolithic layers is a great deal, less, game animals perhaps also including badger (*Meles meles*), wild cattle (*Bos sp.*), beaver (*Castor fiber*), fox (*Vulpes vulpes*), stone marten (*Martes foina*), pine marten (*Martes martes*), wildcat (*Felis silvestris*), alpine ibex (*Capra ibex*), hare (*Lepus europaeus*), otter (*Lutra lutra*), elk (*Alces alces*), wolf (*Canis lupus*) and bear (*Ursus sp.*) (Cannarella, Cremonesi 1967, 289; Riedel 1975; Cremonesi 1984, 106; Montagnari Kokelj 1984, 211-212). Numerous remains of fish in Early Mesolithic layers highlight the important role fishing also had (Cannarella, Cremonesi 1967, 289; Meluzzi et al. 1984, 121). Fish remains belong to rudd (*Scardinus erythrophthalmus*), northern pike (*Esox lucius*), tench (*Tinca tinca*), common carp (*Cyprinus carpio*), nase (*Chondrostoma nasus*) (Cremonesi et al. 1984), barbel (*Barbus barbus*) and gilthead seabream (*Sparus aurata*). Hunting the European pond terrapin (*Emys orbicularis*) and collecting continental molluscs, mainly the large garden snail (*Helix pomatia*), were also widespread. To a lesser extent, they also collected sea molluscs among which mussel (*Monodonta articulata*), common oyster (*Ostrea edulis*) and thorny oyster (*Mitilus sp.*) are represented (Cannarella, Cremonesi 1967, 289; Cremonesi 1984, 106; Meluzzi et al. 1984, 121-122; Boschian, Pitti 1984, 152; Montagnari Kokelj 1984, 211-212).

Hunting larger mammals (red and roe deer, wild boar) continued as the basic hunting activity in the Late Mesolithic (Cannarella, Cremonesi 1967; Riedel 1978-1981, 211; Cannarella 1978; 1998; Cremonesi, Pitti, Radmilli 1984a, 232-233; Montagnari Kokelj 1993, 78). Other of the above-mentioned mammals also remain present with low representation, with the possible exception only of elk (*Alces alces*) and otter (*Lutra lutra*), and perhaps also beaver (*Castor fiber*), since their remains have not yet been discovered in Late Mesolithic layers (Boschian, Pitti 1984, 153; Cannarella, Cremonesi 1967, 289; Cremonesi 1984, 106; Cremonesi et al. 1984, 34-35). It appears that gathering sea molluscs had an important role in the Late Mesolithic, since they reached "almost explosive values" at that time (Boschian, Pitti 1984, 153). Mainly alboran shells (*Trochidae*), limpets (*Patellae*) and mussels (*Monodontae*) were collected, and to a lesser extent also oysters (*Ostreae*) and thorny oysters (*Mitili*) (Cremonesi 1967, 13; Cremonesi 1984, 105-106; Boschian, Pitti 1984, 152-153; Meluzzi et al. 1984, 122-123; Boschin, Riedel 2000, 83). Fishing was maintained, although to a much lesser extent (Cannarella, Cremonesi 1967, 289-290, 322-324), only gilthead seabream (*Sparus aurata*) and goby (*Gobius sp.*) being represented (Riedel 1975, 142; Boschian, Pitti 1994, 153). In the Late Mesolithic, together with hunting and gathering, the rearing of domestic animals also gradually appeared, among which mainly kine (*Ovis vel capra*) and to a lesser extent cattle (*Bos taurus*), and perhaps also pigs (*Sus scrofa*) (Riedel 1975, 138-141; Turk et al. 1993, 72; Boschin, Riedel 2000, 83; Budja 1996a).

In the Early Neolithic, the primary role of hunting was replaced by rearing kine (Steffè de Piero 1978b; Boschin, Riedel 2000, 78-83), which were bred mainly for meat and to a lesser extent

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[41] Such evidence could, for example, be provided by archaeozoological studies on the time of death of animals (Monks 1981). Archaeozoological data touch on numerous themes concerning human activities and strategies on different scales. They offer answers to questions on the activities of various peoples or categories of people at a specific location, on reasons for changes in subsistence strategies, on the appearance and/or changing of the cultivation economy etc. (Reitz, Wing 1999).

[42] The structure of remains of fauna, tools, products and type of stratigraphic units is similar.

[43] The low density of archaeological remains above all suggests this, among which there are a lot of remains of game animals. It is significant in this, as I have already shown, that the best represented bones are of those anatomic parts that are of low use value.

[44] I stress that in this and in the following sections I am only using data that have more or less known stratigraphic context. I am therefore taking into account date from Mitreo cave (Stacul 1971-1972; Steffè de Piero 1978b), Stenašca (Boschian, Pitti 1984; Biagi, Starnini, Voytek 1993; Boschian, Riedel 2000), Jama v Malalanovem dolu (Maselli Scotti 1981-1982), Podmol near Kastelec (Turk et al. 1993), Pečina na Leskovcu (Cannarella, Cremonesi 1967), Pejca na Sedlu (Andreolotti, Gerdol 1972; Riedel 1975), Pečina Podkičer (Montagnari 1981-1982; Montagnari Kokelj 1984), Jama v Zavodu (Cremonesi 1984) and Lonza cave (Meluzzi et al. 1984).

[45] It must be stressed that the picture of the basic economy is based only on archaeozoological sources, since archaeobotanical data is not yet available.

also milk, but they were not used for the production of wool (Boschin, Riedel 2000, 78-80). Raising cattle and pigs is also present, although to a minor extent. The importance of hunting is reduced, but is retained and the range of game animals did not essentially change from the previous period (ib., t. 2). The intensive collecting of sea molluscs is also retained (Steffè de Piero 1978b).

Mobility

The shells of sea molluscs from Early Mesolithic layers in caves on the Karst show that the people that used these locations had contact with the coast. Remains of freshwater fish and amphibians, mammals associated with freshwater currents and fauna that lives in brackish water suggest that the mobility of groups that supported themselves on the Karst plateau in the Early Holocene was also bound to distant areas in the vicinity of the Karst plateau.[46] It is at the same time characteristic of these groups that they collected mainly land snails (Cannarella, Cremonesi 1967; Meluzzi et al. 1984; Cremonesi, Pitti, Radmilli 1984a). They probably did not gather in places far from camp, the numerous remains of these sources of food perhaps highlight a more intensive use of the near vicinity of sites or that the groups sustained themselves for some time in the area of the site (Miracle 1997, 55). Intensive gathering of land snails can cause their depletion, because of which the groups of gatherers that exploited these sources had to move their base camp with a certain frequency and thus allow populations of molluscs to recover (Lubell et al. 1976; Kelley 1995).

The intensity of exploitation of sources from different ecological units greatly reduces with late hunter-gatherer communities, which can also be understood as a reduction in long-distance mobility. Remains of fauna from Late Mesolithic layers are only associated with species which live in the coastal belt of the sea and in open forests.[47] In Late Mesolithic contexts, remains of land snails are extremely rare (Cremonesi, Pitti, Radmilli 1984a, 232), while remains of sea molluscs increase dramatically (Boschian, Pitti 1984, 153, 170) and this is maintained in the Early Neolithic, later gradually losing significance among subsistence activities (Steffè de Piero 1978b). We notice that the increase of frequency of the remains of sea molluscs is recorded quickly when the sea, because of post-glacial transgression approached the edge of the Karst and perhaps even reached it in some parts (Radmilli 1963; Cannarella, Cremonesi 1967, 326-328; Radmilli 1984a; Ogorelec et al. 1997). In addition to the remains of sea molluscs, only species associated with more or less open vegetation appear in the same contexts. The exceptional increase in the representation of the remains of sea sources (Boschian, Pitti 1984, 153) could mark an increase in the regularity with which people had contact with the shore, thus above all an increased intensity of movements between the coast and the interior in a more sedentary system of mobility (Miracle 1997 found similar strategies from the Late Pleistocene and in the Early Holocene).

The remains of sea molluscs belonged to species that could be used for food (*Patellae*, *Mytili*, *Monodonta*, *Ostreae*), as ornament (*Columbella rustica* and *Hinia reticulata*) or both (*Tectonatica affinis operculata*). These molluscs live on a rocky base in the littoral area and normally survive in the belt between high and low tide, and primarily in the vicinity of outflows of fresh water[48] (Milišić 1991). Today they are common in Trieste Bay on the coast below the Karst plateau and on the eastern coast of the bay.

At a time when people intensively exploited sea molluscs, the sea had not yet entirely reached the edge of the Karst, perhaps in some areas small islands rose above the water[49] (Boschian, Montagnari Kokelj 1984), but it is nevertheless possible to assume that the sea was then very close to today's coast (Marocco 1989; 1991; Ogorelec et al. 1997). There were probably permanent and occasional freshwater springs (Accerboni, Mosetti 1967; Galli 1999, 99-103), because of which the existence of freshwater swamps can be presumed. The existence of one in the Early Holocene is proved in the eastern part of Trieste Bay (Ogorelec et al. 1981).

The weight of sea molluscs and their nutritional value is greater during the warm months, because of which P. Miracle believed that the time of gathering sea molluscs was seasonally conditioned (Miracle 1997, 54-55). In the warmer months, the investment of energy in gathering them was also less, since sea molluscs stay in deeper water in the cold months. The same also applies for other sea fauna. Intensive visiting of Karst foothills by the seacoast by people and animals may have been conditioned mainly in the summer, dry months, by the sources of freshwater there. The opportunity of meeting with prey would thus then be greater. In addition, viewed on a larger scale, the coastal belt appears as a strong ecotone between two patches (a concept that in landscape ecology is used for a spatial manifestation of different ecosystems (Farina 1998, 105-111, Mlekuž 2000, 11-13), and on a smaller scale as a complex mosaic of patches (sea, forest, clearings, freshwater areas etc.), with a network of ecotons. Ecotones are the edges between patches, and they are characterised by the presence of species from both patches that are in contact and species that live on the edges, which contributes to their great productivity[50] (Mlekuž 2000, 12). In relation to the space with which we are concerned, the coastal belt is thus the space with maximum affordance (ib., 7, from citat.). Perhaps the late hunter-gatherer communities stayed in this area for extended periods, perhaps they had seasonal or residential camps here (Binford 1982, 7-8). Exploitation of sources

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[46] The remains of game animals found in Pečina na Leskovcu (Cannarella, Cremonesi 1967, 287-290), Jama Lonza (Meluzzi et al. 1984, 121-123), Jama v Zavodu (Cremonesi 1984, 106) and Stenašca (Boschian, Pitti 1984, 152-153) show that the activities of Early Holocene hunters were associated with very diverse habitats: open type forest (mainly red deer - *Cervus elaphus*); standing and slow flowing waters (European pond terrapin - *Emys orbicularis*, rudd - *Scardinus erythrophthalmus*, pike - *Esox lucius*, perch - *Tinca tinca*, carp - *Caprinus carpio*); the mid-current of Alpine rivers (nase - *Chondrostoma nasus*, barbel - *Barbus barbus*); brackish water (gilthead seabream - *Sparus aurata*); seawater (sea molluscs) (Kryštufek 1991; Milišić 1991; Povž, Sket 1990).

[47] This is nicely seen in Late Mesolithic contexts in Stenašca (Boschian, Pitti 1984, 153), where remains belong to gilthead seabream (*Sparus aurata*) - brackish water, goby (*Gobius sp.*) and sea molluscs - saltwater and above all red deer (*Cervus elaphus*) - open forests.

[48] In Pečina na Leskovcu, remains of European razor clam (*Solen marginatus*) were also found in Late Mesolithic deposits. This lives in shallow littoral waters buried in soft sand and silty floors in the direct vicinity of river mouths (Milišić 1991, 84). They are only found today on coasts west of Timava and by river mouths.

[49] A small island was still visible in Trieste Bay in the historical period (Calligaris 1999, 23).

[50] The belt of brackish water, for example, is such.

in the interior, on the Karst plateau, would be associated more with a logistic type of mobility within the logistic radius (Binford 1982, 7-8), which would include mainly areas on the Karst plateau, with the erection of outposts or gatherings in the context of a network of paths on the plateau.

The start and gradual intensification of exploitation of domestic animals, and above all small ruminants, from the Late Mesolithic onwards did not cause a dramatic restructuring of the subsistence systems of hunter-gatherer groups. Intensive shifts between the coast and the interior were initially retained in the Neolithic (Steffè de Piero 1978b). The old gatherings and old paths were also retained, but they increasingly exploited the space on the Karst plateau. The number of gatherings gradually increases (see *Fig. 1*), their role in the subsistence system is ever less connected with predominantly hunting and increasingly more to predominantly pastoral needs.

The intensification of exploitation of sources on the Karst plateau could be explained as a result of the complete or almost complete coverage of the area below the rim of the Karst by sea. The number of ecotones was thus significantly reduced, the sea flooded at least some of the freshwater springs and the affordance was thus reduced. Perhaps this also caused an abandonment of residential camps on the flanks of the Karst and the setting up of new ones in "safer" areas. The ever more intensive pasturage on the Karst plateau caused a restructuring of the vegetation and contributed to the opening of areas (Turk et al. 1993, 70). Because of this, the affordance here increased, and new opportunities were provided for involvement in long distance trade. Mainly from the Neolithic onwards, but perhaps even before that (Budja 1993, note 14), intensive long distance contacts begin, as is demonstrated by the use of exotic materials and prestige objects.[51]

Changes in mobility, mainly in a negative direction, perhaps occured at the end of the Neolithic, in the Eneolithic. It can be seen, namely, that groups on the Karst only from then began to exploit domesticated plants and cultivate the land[52] (Turk et al. 1993, 70), which almost certainly encouraged a more sedentary way of life.

CONCLUSION

The neolithisation of the Karst is a process that extends into the Early Holocene.[53] Postglacial changes, mainly the spread of forests, also restructured the distribution and density of animal species (Evans 1975; Rowley-Conwey 1986). Territorial species spread to the Karst whose optimal habitat is the ecotone between forest and open spaces (mainly red deer - *Cervus elaphus*). Early Holocene hunter-gatherer communities were very mobile and exploited sources over a wide territory. The space of movement embraced the Karst plataeu, flood plains of large water currents (Soča, Vipava) and swamp (Ogorelec et al. 1981) plains on the area of today's Bay of Trieste, which was increasingly contracted because of the transgression of the sea. Perhaps these communities exploited sources mainly within a foraging radius (Binford 1982, 7-8) in the vicinity of a residential camp and prevented the exhaustion of sources by relocating the base camp to more or less distant places.[54]

At the transition to the middle Holocene, also perhaps because of a great reduction of space due to the rise of sea level, the pattern of mobility changed. Perhaps they began to develop systems of logistic mobility with the setting up of base areas within a logistic radius, which included only the sea coast and the Karst plateau. The spectrum of game animals was narrowed, animals connected with freshwater are no longer represented in caves (freshwater fish, otter, European pond terrapin etc.), and the intensity of exploitation of sea sources dramatically increased (Boschian, Pitti 1984, 153). The intensifying of activities on a smaller economic space together with probable contact mainly with new nearby communities of farmers in Friuli, perhaps also in Istria (Petrucci, Riedel 1999, 29-30), encouraged the gradual inclusion of domestic animals in the subsistence economy of the hunter-gatherer groups[55], which probably saw yet another opportunity for enlarging the spectrum of sources and increasing economic security in the new source (Whittle 1996, 36-37). The inclusion of domestic animals can be seen in this perspective as an additional economic strategy with "delayed return", similar to storing, drying and conserving (Woodburn 1980). Exploiting the new sources was compatible with the old, mobile way of life and did not cause a restructuring of strategies of space use[56]. Within the mobile system of the use of space, caves began increasingly to function as pens, in which the now pastoral-hunter-gatherer groups enclosed their herds of kine and cattle (Boschin, Riedel 2000). These groups also began to use pottery (Biagi, Starnini, Voytek 1993, 61), which they probably adopted through contact with the aforementioned strong communities of farmers in Friuli, or less likely, in Istria (Spataro 1997-1998).

From the second half of the seventh millennium B.P, the pastoral-hunter-gatherer economy of communities on the Karst, which relied mainly on the breeding of animals and especially kine, became a permanent way of life (Boschin, Riedel 2000). Perhaps because of the rise in sea level and final flooding of the "Triestine" plain, they withdrew residential camps to the Karst plateau, which became more attractive because of the "opening" of the vegetation (Turk et al. 1993, 70-71), since the possibilities of the affordance of this area increased. The system of mobility did not essential change with these changes, intensive contacts between the coast and the Karst plateau continued

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[51] It can be seen that the use of local chert is replaced by the use of non-local, very high quality chert, probably from the area of Monti Lessini in Italy. Artefacts also appear from obsidian and axes from polished green stone. Perhaps these changes were connected with with the inclusion of the Karst in the system of intensive trade which from the seventh millennium B.P. developed in the North Appennine area, to which settlements of Neolithic farmers in neighbouring Friuli were strongly linked (Pessina, Muscio 1999).

[52] Traces of the use of some stone tools (e.g., in the pre-Neolithic stratum context in Orehova pejca) suggest that these tools were used for cutting plants. These elements do not yet prove pre-Neolithic farming, primarily because it is not neceessary that they were used for cereals. In addition, the fact cannot be overlooked that all these tools are determined in unreliable contexts.

[53] Evidence of man's presence on the Karst in the Pleistocene is rare, and remains from the Late Glacial are completely absent (Broglio 1994).

[54] Intensive exploitation of land snails by Early Holocene groups may suggest precisely such strategies of mobility (Lubell et al. 1976; Miracle 1997, 55).

[55] The remains of domestic animals in Pejca na Sedlu (Riedel 1975, 138-141), which is temporally delineated by radiocarbon dating to 7620 ± 150 BP and 7050 ± 60 BP (Biagi 1994, 60), may draw attention to the possibility that the first domestic animals with hunter-gatherers were more for social than economic reasons (Zvelebil 1994, 135; Sherratt 1982, 23).

[56] Records on the Ljubljansko barje can be similarly interpreted (Mlekuž 2000, 68-77).

(Steffè de Piero 1978b). The communities began to be included in the system of long-distance trade, which is best shown on the Karst, as in the North Italian farming communities, by the influx of alochthonous chert and polished stone tools (Ferrari, Mazzieri 1999; Pessina 1999; Montagnari Kokelj 1993, 81). The circulation of pottery also testifies to contacts between the first communities of farmers in the Padua owlands, in the Eastern Adriatic and the pastoral-hunter-gatherer communities on the Karst (Bagolini, Bressan 1994; Pessina, Ferrari, Fontana 1999), which is generally widespread in the area of the North Adriatic even before the mid-seventh millennium B.P. (Biagi, Starnini, Voytek 1993, 61).

Perhaps the later adoption of arable farming (Turk et al. 1993, 71) and the transition to sedentary forms of settlement on the Karst, which also appears from the gradual cessation of movements between the coast and the interior, was precisely a result of these contacts, which led to a complete dependence of Karst groups on biologically domesticated sources.

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