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STUDII

Aux débuts de l'archéologie moderne roumaine: les fouilles d'Atmageaua Tătărască*

Radu-Alexandru DRAGOMAN**

Abstract: *This text is an analysis of the archive resulting from the 1929-1931, 1933 and 1935 archaeological research at Atmageaua Tătărască, southern Dobrudja (today Sokol, in Bulgaria). The excavations at Atmageaua Tătărască are relevant for the history of Romanian archeology because they correspond to the time of formation and institutionalization of a scientific approach considered to be "modern" and of a research philosophy that would dominate the archaeological practice ever since. The text seeks to contribute to a better understanding of the beginnings of the discipline and also advocates for the redefinition of the current archaeological practice.*

Rezumat: *Textul reprezintă o analiză a arhivei rezultate în urma cercetărilor arheologice din 1929-1931, 1933 şi 1935 de la Atmageaua Tătărască, sudul Dobrogei (astăzi Sokol, în Bulgaria). Săpăturile de la Atmageaua Tătărască sunt relevante pentru istoria arheologiei românești, deoarece corespund perioadei de formare şi instituționalizare a unei demers ştiinţific considerat a fi „modern" şi a unei filosofii de cercetare ce va domina practica arheologică de atunci încolo. Textul își propune să contribuie la o mai bună înțelegere a începuturilor disciplinei și, totodată, pledează pentru redefinirea practicii arheologice din prezent.*

Keywords: *History of archaeology, modern archaeology, "lovers of antiquities", archive, Atmageaua Tătărască, Romania.*

Cuvinte-cheie: *Istoria arheologiei, arheologie modernă, „pasionații de antichități", arhivă, Atmageaua Tătărască, România.*

◈ Introduction

Pendant la première guerre mondiale, lorsque l'armée roumaine, qui luttait près d'Entente, avait été vaincue et une partie du pays occupée par les troupes des Empires Centraux, les archéologues Allemands ont entrepris des fouilles dans plusieurs sites préhistoriques de la Roumanie (Vl. Dumitrescu 2002, p. 30-31). Fait inédit pour le milieu scientifique roumain de cette époque-là, ils ont utilisé dans leurs recherches la méthode stratigraphique d'enregistrement du matériel archéologique. Parmi les fouilles les plus importantes réalisées en 1917 par les archéologues Allemands, on inclut celle de Carl Schuchhardt à Cernavodă, en Dobroudja, qui a mené à l'identification de deux couches culturelles néolithiques (C. Schuchhardt 1919, p. 138; 1924). Schuchhardt était un des premiers archéologues qui avait fait des recherches de manière systématique dans un habitat préhistorique, c'est-à-dire ceux de Römerschanze, près de Potsdam, où il avait fait les fouilles en 1908 et en 1909, en identifiant un habitat de l'âge du bronze («germanique»/«germanisch») et un de l'époque slave (C. Schuchhardt 1909). De façon similaire, Hubert Schmidt, un autre archéologue Allemand qui a fait des fouilles en Roumanie pendant la première guerre

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mondiale, à Sărata Monteoru (des fouilles pas publiées jusqu'à présent), avait antérieurement fait des recherches, en 1909 et en 1910, dans l'habitat de Cucuteni de Moldovie, en établissant l'existence de deux couches culturelles néolithiques (H. Schmidt 1911; 1932). Aux fouilles de Römerschanze, mais aussi à celles de Cucuteni, avait participé aussi l'archéologue Gerhard Bersu, devenu bien-connu, entre autres, pour le fait que dans la période 1911-1929 a fait de complètes recherches dans l'habitat préhistorique de Goldberg de Württemberg, où il a documenté cinq niveaux d'habitation, desquels trois néolithiques (Rössen, Michelsberg et Altheim) et deux de l'âge du fer (Hallstatt C et Latène), dans un dépôt d'environ 80 cm (G. Bersu 1936; 1937; G. Kossack 1992, p. 90).

Les fouilles réalisées par les archéologues Allemands en 1917 ont représenté une source d'inspiration pour le premier programme roumain de recherche systématique des sites préhistoriques, initié dans les années 1920 par Vasile Pârvan (Vl. Dumitrescu 2002, p. 30-31), à ce temps-là, la plus remarquable figure de l'archéologie de Roumanie et directeur du Musée National des Antiquités de Bucarest. Dans ce programme, on a réalisé des fouilles archéologiques dans une entière série de sites préhistoriqus, moment de référence pour la première génération d'archéologues professionnels: Radu Vulpe à Piscu Crăsanilor (1923); le même avec sa femme, Ecaterina Vulpe, font des fouilles à Tinosu aussi (1924); Vladimir Dumitrescu fait des fouilles à Gumelniţa (1925) et à Bonţeşti (1926) et, avec sa femme Hortensia Dumitrescu, à Drăguşeni et à Ruginoasa (1926); Gheorghe Ştefan fait des fouilles à Căscioarele (1925); Vasile Christescu à Boian (1925) et à Vădastra (1926); Dorin Popescu à Lechinţa de Mureş (1925); Ion Nestor à Glina (1926); Ion Nestor avec Ion Andrieşescu à Sărata Monteoru (1926); et Hortensia Dumitrescu à Horodiştea (1929) etc. (Al. Ştefan 1984, p. 137-138) (fig. 1). Beaucoup de rapports concernant ces recherches ont été publiés dans une revue spécialisée fondée dans la même période toujours par Pârvan – *Dacia. Revue d'archéologie et d'histoire ancienne* –, le premier nombre en apparaissant en 1924.

Dans ce contexte, dans l'été de l'année 1929, deux jeunes archéologues, Vladimir Dumitrescu et Dorin Popescu (fig. 2), ont effectué une recherche de surface dans le sud de Dobroudja (Cadrilatere), le long de la rive droite du Danube, entre les villes Turtucaia et Silistra (Vl. Dumitrescu ms.), à la suite de laquelle on a commencé des fouilles archéologiques dans le *tell* d'Atmageaua Tătărască. Les fouilles entreprises par Vladimir Dumitrescu et Dorin Popescu se sont déroulées en cours de plusieurs années (1929-1931, 1933 et 1935). Du point de vue de l'histoire de la discipline, on peut affirmer que leurs recherches s'encadrent à la fin du programme initié par Pârvan et, en même temps, elles constituent un prolongement de celui-ci. À la suite de toutes ces fouilles, on a établi et on a détaillé les rapports chronologiques parmi les divers «civilisations» néolithiques et de l'âge du cuivre du territoire de la Roumanie: Vădastra, Boian, Gumelniţa, Cucuteni etc. (p. ex I. Nestor 1928; Vl. Dumitrescu 1934b).

À la différence de beaucoup de fouilles effectuées antérieurement ou dans la même période, sur celles d'Atmageaua Tătărască on n'a publié ni un rapport général ni de rapports préliminaires. Les résultats et les matériaux obtenus ont constitué seulement l'objet de deux communications présentées à deux premiers congrès internationaux des sciences pré- et protohistoriques de Londres, en 1932, et d'Oslo, en 1936, qui ensuite ont été publiées (Vl. Dumitrescu 1934a; 1934b; respectivement 1937) (fig. 3). En revanche, l'archive concernant les recherches dans le *tell* d'Atmageaua Tătărască réunissent deux manuscrits, un sur toutes les fouilles effectuées et un sur la céramique, auprès des journaux de fouille de deux archéologues impliqués, auprès des plans des fouilles et des dessins de quelques profils et de quelques matériaux archéologiques.

Dans le présent texte, mon point de départ, d'ailleurs très bien montré par Gavin Lucas (2001, p. 202) est que les archéologues dévoilent et font des recherches sur la culture matérielle, mais en plus ils produisent la culture matérielle: des cahiers de fouille, des plans, des profils, des dessins, des manuscrits etc., celui-ci est. Par conséquent, en suivant Laurent Olivier (2008), je considère que les archives concernant les fouilles du *tell* d'Atmageaua Tătărască, auprès d'autres sources d'informations, par exemple les travaux mémorialistiques, se forment dans la mémoire (matérielle et écrite[1]) d'un segment du passé de la discipline. En ce sens, ce texte est une page de l'histoire de l'archéologie roumaine. Les fouilles d'Atmageaua Tătărască sont marquantes pour l'histoire de l'archéologie de Roumanie, car elles correspondent à la période de formation et d'institutionnalisation d'une démarche scientifique considérée «moderne» et d'une philosophie de la recherche qui, désormais, dominerait la practique archéologique. En outre, je partage l'opinion de Ola W. Jensen, conformément à laquelle «history of archaeology is not about the history of archaeology *per se* but really about the archaeology of our own times» (O.W. Jensen 2000, p. 12).

◈ Une philosophie moderniste de la recherche

Tel qu'il résulte des mémoires d'un des protagonistes, mais aussi des documents des archives, l'architecture de la recherche des années 1930 d'Atmageaua Tătărască a été déterminée par la méthode stratigraphique, qui avait comme but la documentation chronologique du matériel archéologique. Dès le début, on a souhaité la section du diamètre entier du *tell*, mais cela n'a pas été possible (Vl. Dumitrescu 1993, p. 88). Finalement, on a tracé plusieures sections et une surface pour préciser la stratigraphie pour que après, quelques portions des fouilles soient élargies et les profils soient refaits (Vl. Dumitrescu ms.). À la différence des formes irrégulières des fouilles entreprises par les «non-professionnels», dans le nouvel âge de l'archéologie roumaine les sections et les surfaces ont une forme géométrique, en inspirant précision et contrôle (fig. 4).

En étant donnée la philosophie de recherche, les narrations des journaux de fouille des archéologues qui ont fait les fouilles à Atmageaua Tătărască sont structurées par les intervalles de profondeur selon lesquels le matériel est collecté – entre 20 et 40 cm environ. Entre les notations de deux archéologues il n'y a pas une différence significative pour exprimer les profondeurs: tandis que Vladimir Dumitrescu mentionne les valeurs qui forment les intervalles de profondeur, Dorin Popescu utilise la syntagme «Bêche X», en précisant pourtant qu'une rangée de bêche est de 20 cm; dans ce dernier cas, l'outil est une expression de la méthode utilisée, et le nombre de la bêche l'équivalent de la valeur des profondeurs. Les textes sont neutres, fractionnés de temps en temps par des esquisses et ils sont constitués par une succession de profondeurs devant lesquelles on énumère et on décrit en grandes lignes les matériaux découverts; quelque fois on fait aussi des appréciations quantitatives, en termes de «beaucoup» ou «moins». Par comparaison, les notations de Vladimir Dumitrescu sont plus détaillées que celles de Dorin Popescu, qui sont plus succinctes. Les textes de Vladimir Dumitrescu contiennent plusieurs éléments de jargon professionnel, qui apparaissent en tout 11 fois: «type Gumelniţa [A] [B]», «type Gumelniţa–Sultana», «type Buckel», «type Boian [A]», «type Glina I», «couche Boian». En revanche, seulement dans un texte de Dorin Popescu

[1] Malheureusement, au moment d'écrire ces lignes, il n'y avait plus de témoins oculaires des fouilles, ainsi, la mémoire orale ne peut plus être enregistrée.

aparraît «tesson Boian». En tout cas, auprès la sobriété de la narration, des chiffres des intervalles de fouille ou du nombre des rangées de bêche, les éléments de jargon professionnel intensifient l'ambience scientifique de la démarche.

Le fait que la stratigraphie constitue l'objectif central de la recherche archéologique résulte aussi de la documentation de fouille: excepté le plan général du *tell*, les seuls enregistrements sur le terrain (dessins sur la feuille milimétrée) des archives sont ceux de quelques profils (fig. 5). Quoiqu'on ait identifié aussi des maisons incendiées ou des foyers (Vl. Dumitrescu ms.), ceux-ci n'ont pas été documentés. Des esquisses de quelques contextes apparaissent seulement dans les calepins (fig. 6). Les seuls contextes des objets sont les profondeurs, considérées importantes pour situer le matériel aux couches culturelles identifiées. Les fiches avec les dessins de quelques vases et fragments céramiques des archives ont comme légende la surface ou la section où ils se trouvaient (pas toujours) et la profondeur à laquelle on les a trouvés (quelque fois, sur le dessin seulement les dimensions étaient écrites) (fig. 7). Dans le manuscrit concernant la céramique d'Atmageaua Tătărască, la présentation est faite d'après les profondeurs.

À leur tour, les thèmes de trois textes publiés confirment que toute la démarche se trouve dans la constellation de la méthode stratigraphique: les deux premiers sont de diverses variantes de la communication de Londres et ils ont comme sujet la stratigraphie du *tell* (Vl. Dumitrescu 1934a; 1934b), tandis que le deuxième se relie à la céramique peinte (Vl. Dumitrescu 1937). Dès les premiers deux textes jusqu'au troisième, la stratigraphie est raffinée. Dans les premiers articles sur Atmageaua Tătărască on mentionne l'existence de quatre couches: Atmagea I = Boian A; Atmagea II = Gumelniţa A; Atmagea III = toujours Gumelniţa A; Atmagea IV = Gumelniţa A et B (Vl. Dumitrescu 1934a, p. 2; 1934b). Dans le troisième article, la couche Atmagea II est équivalue avec Gumelniţa A1, Atmagea III avec Gumelniţa A2, et Atmagea IV seulement avec Gumelniţa B (Vl. Dumitrescu 1937, p. 6 - note 1 et p. 7 - note 4). En ce qui concerne la céramique d'Atmageaua Tătărască (fig. 8), bien qu'on affirme que la peinture n'est pas son trait le plus caractéristique, elle est pourtant considérée être marquable pour des synchronismes chronologiques: «the painted ornaments appertaining to the Gumelniţa civilisation are sufficiently varied to make any relations with the contemporary civilisations, particularly with the painted pottery civilisation from Cucuteni, interesting» (Vl. Dumitrescu 1937, p. 4). En étant donnée l'attention exclussive accordée à la stratigraphie, la céramique a été réuniée et publiée en fonction des couches dans lesquelles elle a été trouvée (Vl. Dumitrescu 1934b; 1937) et pas d'après d'autres critères, par exemple celui fonctionnel, utilisé dès le XIX-ième siècle par les passionnés d'antiquités lorsqu'ils discutaient sur la «céramique préhistorique de Dacie» (p. ex. C. Boliac 2006b, p. 32-58; Gr.C. Tocilescu 1880, p. 510 et suiv.).

En exceptant le tracement ou la modification des surfaces, les décisions prises par les archéologues pendant la fouille ne sont mentionnées ni dans les journaux de fouille, ni dans aucun des manuscrits, ce qui donne l'impression que la fouille s'est déroulée par elle-mêmes. Par exemple, on ne dit rien sur la décision de trier le matériel et de conserver seulement les objets plus ou moins entiers et les fragments marquants pour la chronologie ou pour la documentation des divers types d'activités. Ou bien, une telle décision semble être vraiment prise en tenant compte de la structure de la collection d'Atmageaua Tătărască, mais aussi de l'immense quantité de matériel existente dans un *tell* de l'âge du cuivre.

En outre, sur le contexte dont on a effectué les fouilles, on apprend très peu d'informations. Dans le manuscrit concernant les recherches realisées à Atmageaua Tătărască jusqu'en 1935 y compris, il y a la mention qu'on n'a pas pu faire les fouilles du *tell* entier à

cause de l'absence d'argent (l'année 1929 et les suivants en ayant de petits fonds) et à cause des proprietaires des terrains d'autour qui n'ont pas donné leur permission que la terre excavée soit mise sur leurs propriétés; par conséquent, les archéologues ont dû se contenter avec des fouilles aux dimensions plus modestes et faire des fouilles en marches pour avoir la possibilité de jeter la terre, faisant ainsi la recherche de la couche la plus basse seulement sur certaines portions (Vl. Dumitrescu ms.). Des mémoires d'un des participants parvient pourtant une image plus nuancée: les stratégies électorales des préteurs concernant les vots des Bulgares du village Sarsânlar, le statut de riches gens des colons aroumains et la méfiance des habitants Turcs d'Atmageaua Tătărască envers un éventuel embauchage ont conditionné aussi le déroulement de la recherche (Vl. Dumitrescu 1993, p. 87-88). Des mêmes mémoires on apprend aussi le régime financier dans lequel se déroulaient les fouilles:

> «Dans cette époque-là presque "idyllique", avec peu de formalités bureaucratiques et sans trop de "contrôleurs comptables", nous allions au chantier en voiture, le cocher en figurant lui aussi dans le coupon de payement, tout papier présenté et signé par nous constituait un document justificatif valable. C'est intéressant rappeler le commencement de "Nos mémoires de dépenses": "Voiture à la gare 20 lei; bagagiste 5 lei; déjeuner 25 lei" – et ainsi de suite... En effet, nous avions le droit d'utiliser tout moyen de transport sous la main, en écrivant dans les coupons des salaires le proprietaire du chariot ou de la voiture.» (Vl. Dumitrescu 1993, p. 57)

Un tel «mémoire des dépenses», pas publié, il y a aussi pour les fouilles d'Atmageaua Tătărască, notamment pour les journées 27-31 juillet 1935 (tab. 1):

27 juillet 1935	
marchandises alimentaires	78
Marchandises pharmacie	36
corde + mètre de charpentier	74
28 juillet	
voiture pour la gare	26
bagagistes	26
billets de train ½ + ¼	132
village Jonel	200
bateau à moteur	20
voiture pour Atmagea	400
journaux	6
29 juillet	
avance M. Manolescu	200
avance ouvriers	220
30 juillet	
avance ouvriers	480

31 juillet	
voiture pour Turtucaia	400
barque	100
billet de train	100
voiture	26

Tab. 1. Liste des dépenses d'Atmageaua Tătărască du 27 au 31 juillet 1935 (les valeurs sont en lei).
Lista cheltuielilor din perioada 27-31 iulie 1935 la Atmageaua Tătărască (valorile sunt în lei).

Ces dépenses sont marquables pas seulement pour la compréhension de «l'économie» d'une fouille archéologique en Roumanie des années 1930, mais aussi pour les informations offertes sur le niveau de rémunération des ouvriers et, implicitement, sur le niveau de vie des ceux-ci.

Dans les textes qui forment les archives Atmageaua Tătărască il n'y a pas de références aux gens ou aux événements passés pendant le voyage et les recherches, qui n'aient pas une valeur explicative pour la recherche archéologique. On trouve toujours ce type de mention dans le texte mémorialistique rappelé:

> «Pourtant, le préteur nous a invités à dîner (nous étions accompagnés par mon beau-frère, Ion Dumitrescu, étudiant en architecture), en nous offrant quelques écrevisses de sorte que nous sommes restés un peu à jeun. À peine le deuxième jour dans l'après-midi (c'est une notion pour préciser le temps, car nous n'avons rien trouvé dans le village qui puisse nous apaiser la faim!) nous avons réussi par nos propres démarches, à engager un chariot et arriver ainsi à Atmageaua Tătărască.» (Vl. Dumitrescu 1993, p. 88)

Ou: «chaque soir, nous donnions à Hogea la somme revenue aux ouvriers et à la fin du travail (lorque nous avons été chassés par les pluies automnales apparues de bonne heure, mais très froides), nous avons rédigé les coupons de payement et tous (ou presque tous) ont signé en utilisant l'alphabet arabe!» (Vl. Dumitrescu 1993, p. 88)

En synthétisant, l'image vivante et concrétisée des paragraphes sur l'Atmageaua Tătărască des mémoires contraste avec le ton sec des journaux de fouille, des manuscrits et de deux articles publiés. Seulement les causes «techniques», c'est-à-dire l'absence des fonds nécessaires et l'impossibilité de déposer la terre fouillée en dehors du *tell*, sont mentionnées dans le rapport concernant les fouilles, tandis que les facteurs socio-politiques sont absents du texte académique, mais en revanche ils sont inclus dans un texte mémorialistique. Évidemment, il résulte qu'on à faire avec une démarche qui travaille avec la dichotomie entre l'objectif et le subjectif. Les éléments personnels, sociaux ou politiques sont considérés subjectifs et, par conséquence, on ne devait pas les mêlanger avec une activité scientifique, perçue comme neutre et objective.

Malgré la prétention «d'objectivité», l'interprétation des matériaux est impregnée des opinions personnelles d'un des auteurs des fouilles. Par exemple, tel qu'on observe dans les cours d'archéologie préhistorique faits par Vl. Dumitrescu à l'Université de Bucarest dans les années 1930, aux gens de l'énéolithique on avait attribué une pensée spécifique de l'homme moderne, pensée qui sépare la religion des activités quotidiennes:

> « Avant de transposer les beautés de la nature dans les produits de sa main, l'homme préhistorique s'est préoccupé de la réalisation des instruments et des outils nécessaires aux ennuis quotidiens de la vie. Par ses réalisations, l'homme préhistorique s'est senti à l'abri des soucis et des dangers vus, néanmoins les autres forces pas vues et pas expliquées demeuraient et, à chaque pas, le guettaient et l'abattaient. Ces forces de la nature toujours ennemies – qui partout cachaient un danger mortel – ne pouvaient pas être vaincues; et alors on devait les convaincre. Hors de doute, dans ces sentiments de crainte et d'incertitude doit être cherchée l'origine du sentiment religieux des gens préhistoriques. Tout ce qu'on ne pouvait pas comprendre, tout ce qui semblait au-dessus des pouvoirs de l'homme était surhumain et par conséquent divin.
>
> Si on ajoute à cela le sentiment de totale incompréhension, d'étonnement craintif que les gens ont toujours eu devant la mort des êtres aimés et devant la perspective de la propre mort plus ou moins proche, on comprendra que l'homme primitif ne pouvait pas s'expliquer tout cela que par rapport à l'intervention de la divinité, sans tenir compte du nom et de l'explication qu'on lui donnait, nom que, pour les époques desquelles on s'occupe, est évidemment inconnu et il demeurera ainsi pour toujours.» (Vl. Dumitrescu 2002, p. 130)

Loin d'être une «vérité scientifique», l'interprétation de Vl. Dumitrescu correspond en fait aux propres convinctions secularistes, clairement exposées dans ses mémoires politiques (voir Vl. Dumitrescu 2013).

En outre, il y a aussi une dimension politique, même si elle n'a pas été prononcée. Les fouilles archéologiques d'Atmageaua Tătărască sont caractéristiques pour l'archéologie culturelle et historique. Les objets archéologiques ont été classifiés du point de vue de la typologie du matériel dont ils avaient été confectionnés et de leur fonctionnalité et ils ont été ordonnés du point de vue chronologique par rapport aux couches d'où ils provenaient (voir aussi Vl. Dumitrescu 2002). Selon les analogies avec d'autres sites, les matériaux ont été encadrés dans la «civilisation Gumelniţa», qui, selon la stratigraphie des sites attribués, a été partagée en plusieurs phases d'évolution. L'origine d'une telle démarche réside dans la philosophie cartésienne, selon laquelle, pour pouvoir être comprise, toute entité complexe doit être décomposée dans ses éléments constitutifs, à l'aide de quelques méthodes qui assurent l'élimination de l'analyse de toute forme de subjectivisme ou de superstition de la partie de l'interprète (J. Thomas 2004). En ce qui concerne l'archéologie culturelle et historique, il s'agit de la conjugaison de trois méthodes: la stratigraphie, la chronologie et la chorologie (V.G. Childe 1929; 1956). «La culture archéologique» est considérée l'équivalent d'une ethnie; conséquemment, on croit que la détermination des phases d'évolution et des rapports chronologiques parmi les «cultures» mènerait à la reconstitution de l'évolution historique de différentes populations/ethnies de la zone géographique étudiée. Le dernier objectif du programme de recherches initié par V. Pârvan poursuivait la découverte de l'ancienneté de l'origine de la nation roumaine, l'importance et la signification de l'ancienne histoire de la Roumanie dans le contexte universel et de l'Europe du sud-est (Al. Ştefan 1982, p. 304; 1984, p. 137-138). Donc, les fouilles d'Atmageaua Tătărască ont aussi un caractère politique (nationaliste) et, implicitement, elles contribuent à la documentation du passé préhistorique, multimillénaire, du peuple roumain.

Pas dernièrement, on doit amener la discussion sur les fouilles archéologiques d'Atmageaua Tătărască qui n'ont pas produit seulement des archives, deux articles et une collection d'objects, mais, au même temps, ils ont produit aussi des archéologues, afin

d'utiliser l'expression de Björn Nilsson (2011, p. 29). Éloquent de ce point de vue est le cas de Vladimir Dumitrescu. Avant de réaliser les fouilles d'Atmageaua Tătărască, Vl. Dumitrescu avait déjà fait des recherches dans d'autres sites préhistoriques. Son activité sur le terrain avait commencé en 1923, lorsqu'il avait participé aux fouilles du *tell* de Sultana, dirigées par Ion Andrieşescu, l'adjoint de Pârvan. Ensuite, il a participé auprès de Gheorghe Ştefan aux fouilles de Căscioarele en 1925, a dirigé personnellement les fouilles de Gumelniţa, en 1925, et Bonţeşti, en 1926; en collaboration avec sa femme, Hortensia Dumitrescu, a effectué des fouilles à Drăguşeni et Ruginoasa, en 1926 (Al. Ştefan 1984, p. 137; voir Vl. Dumitrescu 1993). À Gumelniţa, il a utilisé pour la première fois la méthode stratigraphique et il a identifié deux couches culturelles qu'il a dénommées «Gumelniţa A» et «Gumelniţa B» (Vl. Dumitrescu 1925). Les mêmes termes sont appliquées aussi aux couches et aux matériaux d'Atmageaua Tătărască; en d'autres mots, les fouilles confirment et consolident les termes de «Gumelniţa A» et «B». Ainsi, on institue et on confère autorité à un système de classification et de périodisation qui est utilisé aujourd'hui aussi.

Les fouilles archéologiques contribuent fondamentalement à la formation d'une nouvelle catégorie d'archéologues, dont le trait distinctif est l'utilisation de la méthode stratigraphique. À la suite des fouilles effectuées, ces archéologues introduisent un nouveau style narratif et un nouveau language professionnel. Les fouilles créent une élite professionnelle, qui formera le groupe des «fondateurs» de l'archéologie moderne roumaine. Sans ces fouilles, cette élite n'aurait pas existé.

◈ Archéologie «moderne» *versus* archéologie «à l'ancienne mode»

L'apparition d'une nouvelle catégorie d'archéologues à la suite des fouilles des années 1920-1930 a mené à une rupture et à une attitude critique envers la pratique scientifique du passé. Dans un de ses cours universitaires des années 1930, Vladimir Dumitrescu s'exprime catégoriquement en ce sens:

> «Bien sûr, les recherches d'archéologie préhistorique sont dans notre pays beaucoup plus anciennes que les derniers dix ans. Mais les recherches entreprises avant cette décennie ou mieux, les recherches entreprinses avant la guerre, ont été faites presque toujours par des gens qui n'avaient aucune préparation spécialisée, mais seulement une légitime et noble curiosité pour l'éloigné passé de notre pays. Tant que ce désir de connaître les formes très anciennes de civilisation soit explicable et dans une certaine mesure même excusable, ces entreprises ne pouvaient mener qu'à des résultats douteux, car elles étaient faites sans aucun critère scientifique. Les stations préhistoriques étaient fouillées à tout hasard, seulement par amour du riche matériel qui se trouvait. Et ainsi, elles étaient le plus souvent inutilisables pour toute conclusion scientifique. Dans quelques recherches récentes, j'ai eu l'occasion de constater que les fosses fouillées dans quelques stations ont fureté presque toute la surface de celles-ci et ainsi, des recherches ultérieures ici sont devenues impossibles. Il ne nous reste que le matériel museistique, qui ne peut être utilisé pour aucune conclusion d'ordre stratigraphique et donc chronologique.
>
> Cette-ci est la grande faute de toutes les recherches entreprises par les amateurs quelque fois avec de bonnes intentions, mais dont l'activité est le plus souvent absolumment contraire aux intérêts de la science.

> Pourtant il n'est pas moins vrai – et nous y reconnaissons sans hésitation – que dans la deuxième moitié du siècle passé, lorsque Cesar Bolliac, Buţureanu et Beldiceanu étaient passionnés par ces recherches d'archéologie préhistorique, ils étaient aussi les pionniers roumains de notre science et par conséquent leur fautes peuvent passer sous silence, à condition formelle que désormais l'amateurisme et le dilettantisme archéologique cesse.» (Vl. Dumitrescu 2002, p. 29-30)

En effet, de plusieurs points de vue, les fouilles entreprises par les «passionnés d'antiquités» dans des sites préhistoriques sont différentes aux fouilles soi-disant scientifiques, un exemple marquable dans ce sens est celui de Cezar Bolliac.

Le but des fouilles de Bolliac était orientée vers la récolte la plus attentive des objets; cette attention est éloquemment illustrée par la suivante citation, choisie d'un texte sur les fouilles de la nécropole d'incinération de Zimnicea:

> «Un vase avec 20 cm hauteur, un ouvrage et des ornements très distingués, fêlé dans toutes les parties à cause du gonflement des racines de chiendent [...] ce vase dont la description serait inutile à celui qui ne le voit pas, était écrasé dans la terre entre le gonflement du chiendent à l'intérieur et le serrement de la terre à l'extérieur. Je l'ai tiré intact, avec tous les petits tessons à leur place.
>
> Qu'on me permet cette petite fierté d'explorateur, car elle n'a pas d'autre mérite que l'observation, la patience et la finesse du tâtonnement.» (C. Bolliac 2006b, p. 20)

En contraste avec les rapports de fouille de «l'archéologie moderne», dans les textes sur ses fouilles, Bolliac mentionne chaque décision qu'ils ont pris, y compris le fait qu'il a sélectionné le matériel, en conservant seulement ce qui était plus entier: par exemple, dans un des articles concernant les fouilles de l'habitat de Vădastra, il écrit qu'il a trouvé «hors trois milles silex, excepté ceux lâchés qui ne représentaient rien» (C. Bolliac 2006b, p. 8). En outre, dans les articles concernant les voyages archéologiques qu'il a entrepris, Bolliac écrit ses impressions sur les villages et sur les villes à travers lesquels il est passé (p. ex. l'aspect pitoyable de la ville Turnu à ce temps-là), il décrit des événements auxquels il a participé (p. ex. un mariage turc à Nicopole) ou des gens qu'il a rencontrés ou auxquels il s'est seulement intercroisé (C. Bolliac 2006a, p. 46-86).

Aussi le style narratif de Cezar Bolliac est très différent pour ce qui regarde les rapports secs, descriptifs et neutres des élèves de Vasile Pârvan. Dans ses textes on rencontre des expressions rhétoriques, par exemple celles concernant les découvertes de Vădastra:

> «Comment est-il possible une telle identité entre les objets de l'âge de la pierre en Scandinavie, Bretagne et Suisse, Gaule – et ces objets de Dacie, beaucoup plus récents que ceux-là? Comment est-il possible que la flèche de Dacie, plus moderne, soit pareille à celles d'autres localités si approfondies en l'ancienneté? Comment est-il possible que le couteau et tout l'autre, soient presque pareils? Comment est-il possible que les objets en os soit similaires? Comment est-il possible que les pierres pour frotter les grains soient pareilles etc.?» (C. Bolliac 2006b, p. 13)

Après d'autres considérations, Cezar Bolliac offre aussi la réponse: «Voici ce que me fait supposer un âge de la pierre en Dacie aussi, contemporain aux âges de la pierre d'Helvetie, de la Gaule, etc., soit de la pierre ciselée et polie» (C. Bolliac 2006b, p. 14). À la différence du

«savant» moderne, Bolliac ne cache pas son sentiment de fascination devant les objets qu'il découvre, la preuve, par exemple, est constituée par les expressions utilisées toujours dans le texte sur les fouilles de Vădastra: «des flèches en silex aux facettes, enfin, très belles», «une magnifique hache en cuivre rouge, admirablement patinée» ou «Ce vase est le plus beau du point de vue de la symétrie et de l'élégance de tous les vases entiers que nous avons fait sortir de Vodastra» (C. Bolliac 2006b, p. 37, 40 et 46). En outre, Cezar Bolliac essaie d'imaginer les gens qui avaient utilisé les uns ou les autres des objets; dans son rapport sur la nécropole d'incinération de Zimnicea, il écrit:

> «Trois bracelets en bronz nous avons trouvés dans ces vases, pourtant un, et le plus parfait, ne me permet pas d'y négliger l'histoire. Dans une écuelle parfaite de tous les points de vue, couverte par un couvercle que j'ai dû faire sortir en lambeaux, mais qui sera vu intact sur mes étagères, en décollant le couvercle de l'écuelle, au milieu, sur les ossements brûlés et y déposés se trouvait ce bracelet. Au milieu du bracelet, une sorte de perle en os blanche, aplatie, et beaucoup trouée au milieu, et près de cette perle un bout de chaînette en argint très bien fait, sans faute rompu par le feu, au milieu duquel, dans l'enroulement duquel, un objet en cuivre d'un morceau à un morceau et demi, admirable travail, grec en apparence. Je peux dire seulement que cette amulette, la chaînette passée à travers ce médaillon qui a été porté au cou par une jeune femme Dace brûlée, qui a été parée avec ses favorits ornements et ensuite les os ont été amassés et entre ceux-ci, des objets pas fondus par le feu ont été trouvés et y ont été posés par une main sympatique: de mère, d'époux ou de sœur.» (C. Bolliac 2006b, p. 20-21)

Une différence pour ce qui regarde les textes produits par une «démarche moderne» est digne d'être mise en évidence: après ce paragraphe, sans délais, Cezar Bolliac critique sa propre curiosité et son propre manque d'habileté au moment de la recherche:

> «Oh, si la curiosité et l'inhabileté pour ce que l'écuelle contient jusqu'au fond ne m'avaient pas obligé à chercher, une belle chose aurait été dans notre musée cette écuelle avec des ossements, avec ces ornements posés au-dessus au milieu, pas touchés pendant deux mille ans au moins!
>
> La curiosité et l'inhabileté détruisent plus dans une heure, dans un moment que les milles ans!
>
> Enfin, les objets sont intacts, quoique faits sortir par des mains profanes de la place où la piété conjugale ou materne les eût posés.» (C. Bolliac 2006b, p. 21)

À tout cela on devrait ajouter que Cezar Bolliac se plaint dans ses textes aussi des conditions dans lesquelles il déroule ses recherches:

> «J'ai espéré sans cesse que les relations que j'avais donné sur cet espace intéressant [Vădastra] feront, obligeront le gouvernement à s'en occuper, à vouloir nous enregistrer nous aussi dans la science moderne qui préoccupe les savants des deux hémisphères: c'est-à-dire à faire parler aussi du territoire de Dacie à ce sujet, ainsi qu'on parle de celui de Scandinavie, d'Irlande, d'Helvetie, etc.
>
> En vain les articles! En vain l'Exposition des objets si curieux et si intéressants! En vain les prières ardentes vers tout le gouvernement, vers tous les gens importants de la journée!» (C. Bolliac 2006b, p. 6)

> «L'idée d'explorer tout la ronde du bord intérieur de l'île [Vădastra] et ensuite le centre, me préoccupe dès que j'ai trouvé cette ronde habitée dans la plus profonde ancienneté. L'idée a été naturelle et le plan aisément à faire – mais l'exécution? Ici, en parlant seulement de l'île, il faut deux-trois cents personnes qui travaillent de grand cœur au moins une semaine et moi, j'ai eu seulement quelques personnes et l'amabilité de l'intelligent sous-préfet, monsieur Iorgu Prijbeanu, mais aussi la bonne volonté de monsieur fermier Jianu, desquelles je devait me hâter à profiter en rien que deux jours.» (C. Bolliac 2006b, p. 7)

Malgré le discours de Vladimir Dumitrescu, Cezar Bolliac percevait soi-même comme un «savant». Ainsi, il devancait ceux qui n'avaient pas les connaissances nécessaires pour apprécier le site de Vădastra: «J'attends un temps meilleur pour pouvoir explorer cette localité tel qu'elle mérite d'étre explorée et je serais très chagriné si quelque main profane s'introduisait à méler mon travail» (C. Bolliac 2006b, p. 11). Cezar Bolliac milite aussi pour protéger l'habitat: «Tout ce que je prie aujourd'hui le gouvernement, est de donner des ordres sévères pour conserver cette localité» (C. Bolliac 2006b, p. 11). D'ailleurs, les informations offertes sont de plusieurs perspectives détaillées et même visionnaires: par exemple, les vases publiés de Vădastra sont accompagnés par des descriptions, les dimensions en sont mentionnées et Cezar Bolliac soutient la réalisation des analyses chimiques du contenu des récipients (C. Bolliac 2006b, p. 9; 2006b, p. 46-58).

Les recherches de C. Bolliac ne représentent pas une exception. Les fouilles de Cucuteni et les textes afférents réalisés par les «passionnés d'antiquités» diffèrent dans l'esprit des fouilles et des textes des «archéologues professionnels». En commençant même par le niveau de la forme, on peut observer que les surfaces fouillées par les premiers sont irrégulières pour ce qui regarde la symétrie des surfaces des derniers (fig. 9). Dans les travaux des «collectionneurs» on rencontre des fragments aux expressions poétiques et aux références subtiles à la disposition spirituelle:

> «Beau est le panorama qui se déroule devant les yeux de cette hauteur-là; en haut Cotnar avec ses renommés vignobles et avec la colline "Catalina" qui élève fièrement ses cimes dorées par les souvenirs historiques; en bas, d'une partie, les chaînes des vallons qui s'étendent vers Târgul-Frumos; d'autre partie, la plaine de Bahlui qui se perd dans l'horizon de Iaşi, et dans la vallée le village Băicenii est fermé dans un amphithéâtre de collines qui présente une position romantique et au même temps stratégique.» (N. Beldiceanu 1885a, p. 188)

Les appréciations subjectives envers un objet ou un autre ne manquent pas, telles que «L'objet le plus curieux», «Le plus bel objet en os», «Un autre objet, très curieux», «cette délicate poterie», «Le plus curieux exemplaire» etc. (Diamandi 1889, p. 584-586). Ni les premiers chercheurs du site de Cucuteni ne mentionnent pas les contextes desquels proviennent les objets, mais ils font attention à la récolte attentive de ceux-ci d'après les profondeurs:

> «Tandis que les quatre ouvriers faisaient des fouilles, en dévêtant de terre une maison, et ensuite en fouillant la poussière avec les bêches pour pouvoir trouver les traces des antiquités perdues dans la boue de terre, monsieur Butculescu poursuivait par de diverses fouilles les fragments de poterie aux dessins colorés ou aux impressions variées et je prenais la mesure de la surface du plateau mais aussi la profondeur des fouilles.» (N. Beldiceanu 1885a, p. 188)

Même si la postérité ne leur a pas reconnu le statut de «savants», dans un des textes «des collectionnaires» sont enregistrées les profondeurs desquelles proviennent les objets en discussion, en outre, la présentation est faite selon les catégories des matériaux, y compris la faune et la flore (voir Diamandi 1889) – une manière de publication qui caractérise aussi l'archéologie (moderne) culturelle et historique. En plus, dans un autre texte on offre des informations sur la topographie et sur la stratigraphie du site, inclusivement (Gr.C. Buţureanu 1889, p. 260-261, 263). D'ailleurs, «les passionnés d'antiquités» qui ont réalisé des fouilles à Cucuteni se considèrent eux-mêmes des «savants» et ils militent pour la protection du site ; Nicolae Beldiceanu conclue son rapport:

> «En attirant l'attention au Gouvernement et à nos archéologues sur l'importance de la station de Cucuteni, avec l'espoir que cette découverte ne sera pas laissée de nouveau à s'enterrer dans l'obscurité de laquelle par hasard est sortie, car je désire que ce pays aussi puisse servir l'humanité du point de vue scientifique.» (N. Beldiceanu 1885a, p. 192)

Dans une autre variante du même paragraphe cité, Nicolae Beldiceanu caractérise même les «savants»:

> «Je ne doute pas que l'amour de la verité, l'impartialité et le sérieux qui doivent caractériser aujourd'hui plus que jamais les savants, répondront à mes efforts et ne permettront pas que cette découverte s'enterre de nouveau dans l'obscurité de laquelle par hasard est sortie, car je désire que ce pays aussi puisse servir l'humanité du point de vue scientifique.» (N. Beldiceanu 1885b, p. 9)

Entre la démarche des «passionnés d'antiquités» et celle des «archéologues professionnels» des années 1920-1930 il y a aussi quelques ressemblances qui ne sont pas à négliger: l'absence de la mention des contextes desquels les objets proviennent; l'attention accordée aux objets; la préoccupation pour la protection des sites (tab. 2).

Malgré cela, comme on a déjà mentionné, l'archéologie des «passionnés d'antiquités» a été critiquée par les représentants de «l'archéologie moderne» et condamnée à devenir «histoire». Les fouilles d'Atmageaua Tătărască correspondent à un moment fondateur: le crépuscule du romantisme et le triomphe du mythe scientifique, de l'objectivité et de la rationalité, dans la pratique archéologique de Roumanie.

ARCHEOLOGIE MODERNE	ARCHEOLOGIE DES PASSIONNES D'ANTIQUITES
Scientifique (chercheur)	Collectionneur
Surfaces régulières	Surfaces irrégulières
Méthode	Sans méthode
Approche scientifique	Approche non-scientifique
Rigueur	Romantisme
Objectif	Subjectif
Neutre	Personnel
Nationalisme	Patriotisme
Absence de contextes	
Attention accordée aux objets	
Préoccupation pour la protection des sites	

Tab. 2. Comparaison entre l'archéologie moderne et celle des passionnés d'antiquités. Comparația dintre arheologia modernă și cea a pasionaților de antichități.

◈ Conclusion: pour une archéologie contemplative

La philosophie de recherche «scientifique» construite par les élèves de V. Pârvan a dominé l'archéologie de Roumanie et persiste encore. Pourtant, tel qu'on a montré en d'autres occasions aussi (Al. Dragoman, S. Oanţă-Marghitu 2006; Al. Dragoman 2009a; 2009b), à la fin de l'expérience totalitaire communiste entre 1945 et 1989, les prétentions d'objectivité et de neutralité tacitement invoquées par ce type de pratique ont perdu «l'innocence», pour utiliser l'expression de David Clarck, en étant en effet une illusion. Ce qu'on a considéré à un certain moment «neutralité», s'est révélé politique et ce qu'on a considéré «vérité scientifique/objective», s'est révélé vérité éphémère. Les contextes socio-politiques et les visions personnelles sur la vie ont influencé la pratique archéologique, mais cet aspect n'a pas été reconnu et il a été excisé du discours scientifique et des publications académiques, en menant à une forme de dedoublement, devenue évidente surtout dans le contexte du régime totalitaire communiste. En tenant compte de cette leçon, les expériences personnelles de vie et celles professionnelles, les émotions et l'implication qu'on rencontre dans l'archéologie du XIX-ième siècle en Roumanie, doivent être englobées de nouveau dans la discipline. Cela ne signifie pas renoncer à la rigueur, aux méthodes ou à la connaissance accumulée jusqu'à maintenant, mais seulement réhabiliter la démarche «des passionnés d'antiquités» au delà de leur statut de «précurseurs». Mais surtout on doit redécouvrir la dimension contémplative de l'archéologie (H. Karlsson 1997; 2000). De ce point de vue, les pensées d'un «collectionneur» du XIX-ième siècle devant l'habitat de Cucuteni sont plus actuelles que jamais – en effet, les vestiges archéologiques «restent devant nous muettes et pas expliquées, tel que le mystère d'une vie sur laquelle la terre s'est déposée» (N. Beldiceanu 1885a, p. 187).

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◈ Bibliographie

N. Beldiceanu 1885a	Antichităţile de la Cucuteni, *Revista pentru Istorie, Arheologie şi Filologie*, 3 (5), p. 187-192.
N. Beldiceanu 1885b	Antichităţile de la Cucuteni, p. 1-9, extras.
G. Bersu 1936	Rössener Wohnhäuser vom Goldberg, O.A. Neresheim, Württemberg, *Germania*, 20 (4), p. 229-243.
G. Bersu 1937	Altheimer Wohnhäuser vom Goldberg, O.A. Neresheim, Württemberg, *Germania*, 21 (3), p. 149-158.
C. Bolliac 2006a	*Excursiuni arheologice*, vol. 1, Editura Floare Albastră, Bucarest.
C. Bolliac 2006b	*Excursiuni arheologice*, vol. 2, Editura Floare Albastră, Bucarest, p. 32-58.
Gr.C. Buţureanu 1889	Notiţă asupra săpăturilor şi cercetărilor făcute la Cucuteni din comuna Băiceni judeţul Iaşi, *Arhiva Societăţii Ştiinţifice şi Literare din Iaşi*, 3 (Noiembrie-Decembrie), p. 257-271.
V.G. Childe 1929	*The Danube in Prehistory*, Clarendon Press, Oxford.
V.G. Childe 1956	*Piecing together the past. The interpretation of archaeological data*, Routledge & Kegan Paul, London.
Diamandi 1889	Station préhistorique de Coucoutenie, *Bulletins de la Société d'anthropologie de Paris*, III Série, tome 12, p. 582-599.
Al. Dragoman 2009a	Ideology and politics in researching the (E)Neolithic in Romania, *Dacia (NS)*, 53, p. 167-189.
Al. Dragoman 2009b	Professional education and fieldwork in communist and post-communist Romania: on the ethics of responsibility in the archaeological practice, dans I. Popa (ed.), *Experimentul Piteşti» Conference Proceedings. Comunicări prezentate la simpozionul «Experimentul Piteşti – reeducarea prin tortură». Cultura, tineretul şi educaţia în regimurile dictatoriale comuniste*, ediţia a VIII-a, Piteşti, 3-5 octombrie 2008, Fundaţia Culturală «Memoria» – Filiala Argeş, Piteşti, p. 345-355.
Al. Dragoman, S. Oanţă-Marghitu 2006	Archaeology in communist and post-communist Romania, *Dacia (NS)*, 50, p. 57-76.
Vl. Dumitrescu ms.	*Săpăturile dela Atmageaua–Tătărască (Tatar–Atmageà; fostul jud. Durostor, Dobrogea de Sud) – 1929, 1931, 1933 şi 1935*, ms.

Vl. Dumitrescu 1925 — Fouilles de Gumelniţa, *Dacia*, 2, p. 29-103.

Vl. Dumitrescu 1934a — La stratigraphie des stations appartenant à la civilisation énéolithique balkano-danubienne, à la lumière des fouilles d'Atmageaua-Tătărască (département de Durostor), Roumanie, *Proceedings of the First International Congress of Prehistoric and Protohistoric Sciences*, 1-6 August 1932, Londres, p. 1-2.

Vl. Dumitrescu 1934b — La stratigraphie des stations appartenant à la civilisation énéolithique balkano-danubienne, à la lumière des fouilles d'Atmageaua-Tătărască (au sud du Danube, département de Durostor, Roumanie), *Istros*, 1, p. 37-43.

Vl. Dumitrescu 1937 — The painted decoration of the pottery from the Eneolithic station near Atmageaua-Tătărască (Department of Durostor, Dobrogea, Rumania), *Annals of Archaeology and Anthropology*, 24 (1-2), p. 3-14, Plates I-V.

Vl. Dumitrescu 1993 — *Oameni şi cioburi. Contribuţii la istoria contemporană a arheologiei româneşti*, CCDJ, 11, Muzeul Dunării de Jos, Călăraşi.

Vl. Dumitrescu 2002 — *Cursuri universitare de arheologie preistorică*, Editura Mica Valahie, Bucarest.

Vl. Dumitrescu 2013 — *Mărturisirile unui «criminal politic»*, Editura Babel, Bacău.

O.W. Jensen 2000 — When archaeology meets Clio: reflections on writing the history of archaeology, dans O.W. Jensen, H. Karlsson (ed.), *Archaeological conditions. Examples of epistemology and ontology*, Gotarc Series C, Arkeologiska Skrifter, no. 40, Göteborg University–Department of Archaeology et University of Latvia–Faculty of History and Philosophy, Göteborg, p. 11-23.

H. Karlsson 1997 — Anthropocentrism revisited: a contemplative archaeological critique, *AD*, 4 (1), p. 114-119.

H. Karlsson 2000 — Conversation in front of a megalith: a contemplative approach to archaeology and our interpretative existence, dans O.W. Jensen, H. Karlsson (ed.), *Archaeological conditions. Examples of epistemology and ontology*, Gotarc Series C, Arkeologiska Skrifter, no. 40, Göteborg University–Department of Archaeology et University of Latvia–Faculty of History and Philosophy, Göteborg, p. 55-66.

G. Kossack 1992 — Prehistoric archaeology in Germany: its history and current situation, *Norwegian Archaeological Review*, 25 (2), p. 74-109.

G. Lucas 2001 — *Critical approaches to fieldwork: contemporary and historical archaeological practice*, Routledge, Londres et New York.

I. Nestor 1928 — Zur Chronologie der rumänischen Steinkupferzeit, *PZ*, 19, p. 110-143.

B. Nilsson 2011 — Archaeology and the unstoppable excavation machine. A Swedish point of view, *AD*, 18 (1), p. 26-29.

L. Olivier 2008 — *Le Sombre abîme du temps. Mémoire et archéologie*, Éditions du Seuil, Paris.

H. Schmidt 1911 — Verläufiger Bericht über die Ausgrabungen 1909-1910 von Cucuteni bei Iassy (Rumänien), *Zeitschrift für Ethnologie*, 43, p. 581-601.

H. Schmidt 1932 — *Cucuteni in der oberen Moldau, Rumänien. Die befestigte Siedlung mit bemalter Keramik von der Steinfupferzeit in bis die vollentwickelte Bronzezeit*, Walter de Gruyter & Co., Berlin et Leipzig.

C. Schuchhardt 1909 — Die Römerschanze bei Potsdam nach den Ausgrabungen von 1908 und 1909, *PZ*, 1, p. 209-238.

C. Schuchhardt 1919 — *Alteuropa in seiner Kultur- und Stilentwiklug*, Verlag von Karl J. Trübner, Strasbourg et Berlin.

C. Schuchhardt 1924 — Cernavoda, eine Steinzeitsiedlung in Thrakien, *PZ*, 15, p. 9-27.

Al. Ştefan 1982 — Vasile Pârvan, istoric al antichităţii clasice în România, fondator al şcolii naţionale de arheologie şi epigrafie, *SCIVA*, 33 (3), p. 302-336.

Al. Ştefan 1984 — Istoricul Muzeului Naţional de Antichităţi din Bucureşti – Institutul de Arheologie II. Progresele arheologiei şi muzeografiei în România în perioada 1881-1927, *SCIVA*, 35 (2), p. 109-143.

J. Thomas 2004 — *Archaeology and modernity*, Routledge, Londres et New York.

Gr.C. Tocilescu 1880 — *Dacia inainte de romani. Cercetari asupra poporeloru carii au locuitu Tierile Romane de a stang'a Dunarii, mai inainte de concuista acestoru tieri de cotra imperatoriulu Traianu*, Tipografia Academiei Române, Bucarest.

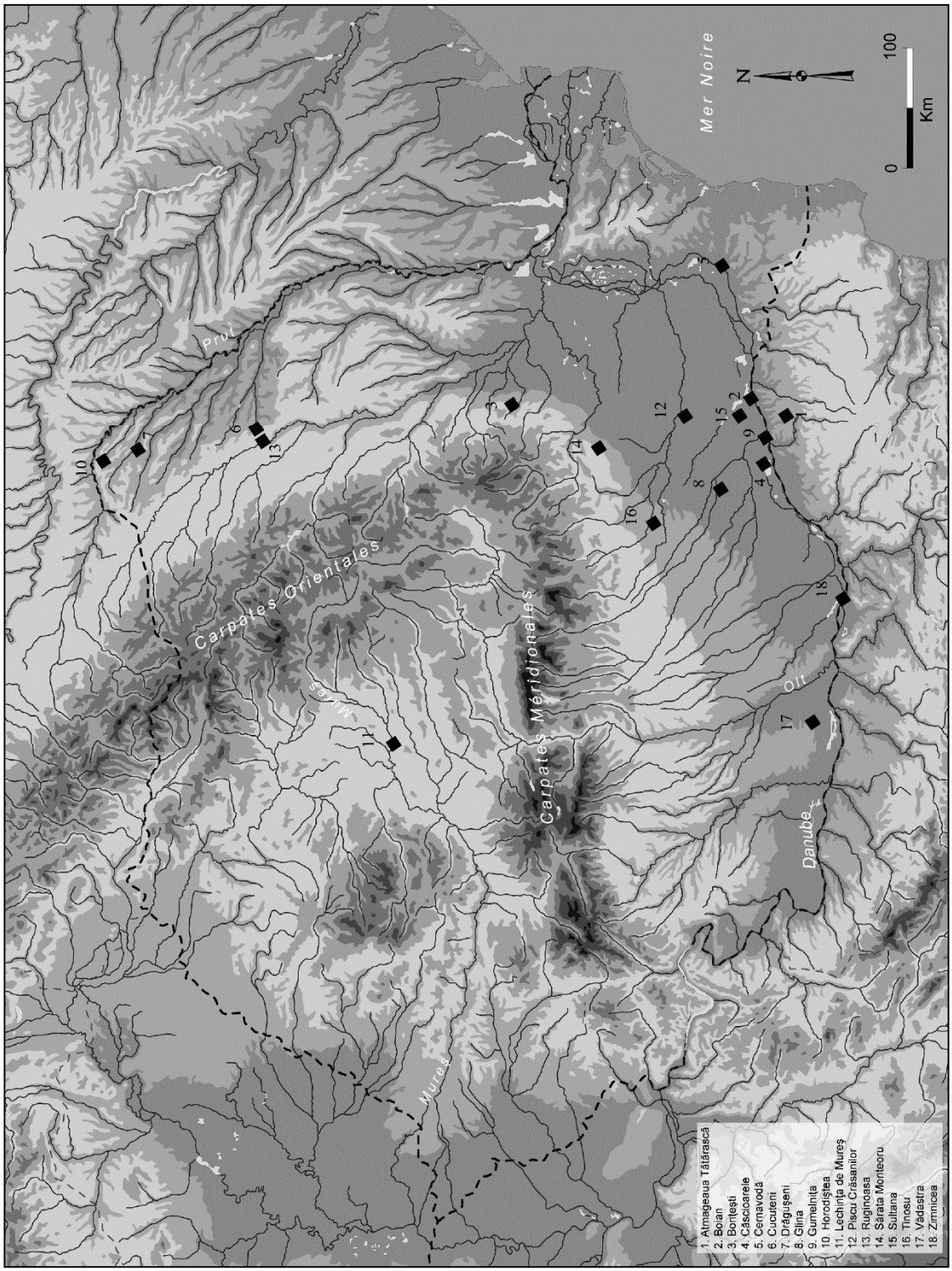


Fig. 1. Carte avec les sites mentionnés dans le texte.
Hartă cu siturile menţionate în text.

Fig. 2. Vladimir Dumitrescu (à gauche), Vasile Christescu (au centre) et Gheorghe Ștefan (à droite) dans la salle du Seminaire d'Histoire Antique (après Vl. Dumitrescu 1993).
Vladimir Dumitrescu (stânga), Vasile Christescu (centru) și Gheorghe Ștefan în sala Seminarului de Istorie Antică (dreapta) (după Vl. Dumitrescu 1993).

Fig. 3. Le congres d'Oslo en 1936.
Congresul de la Oslo din 1936.

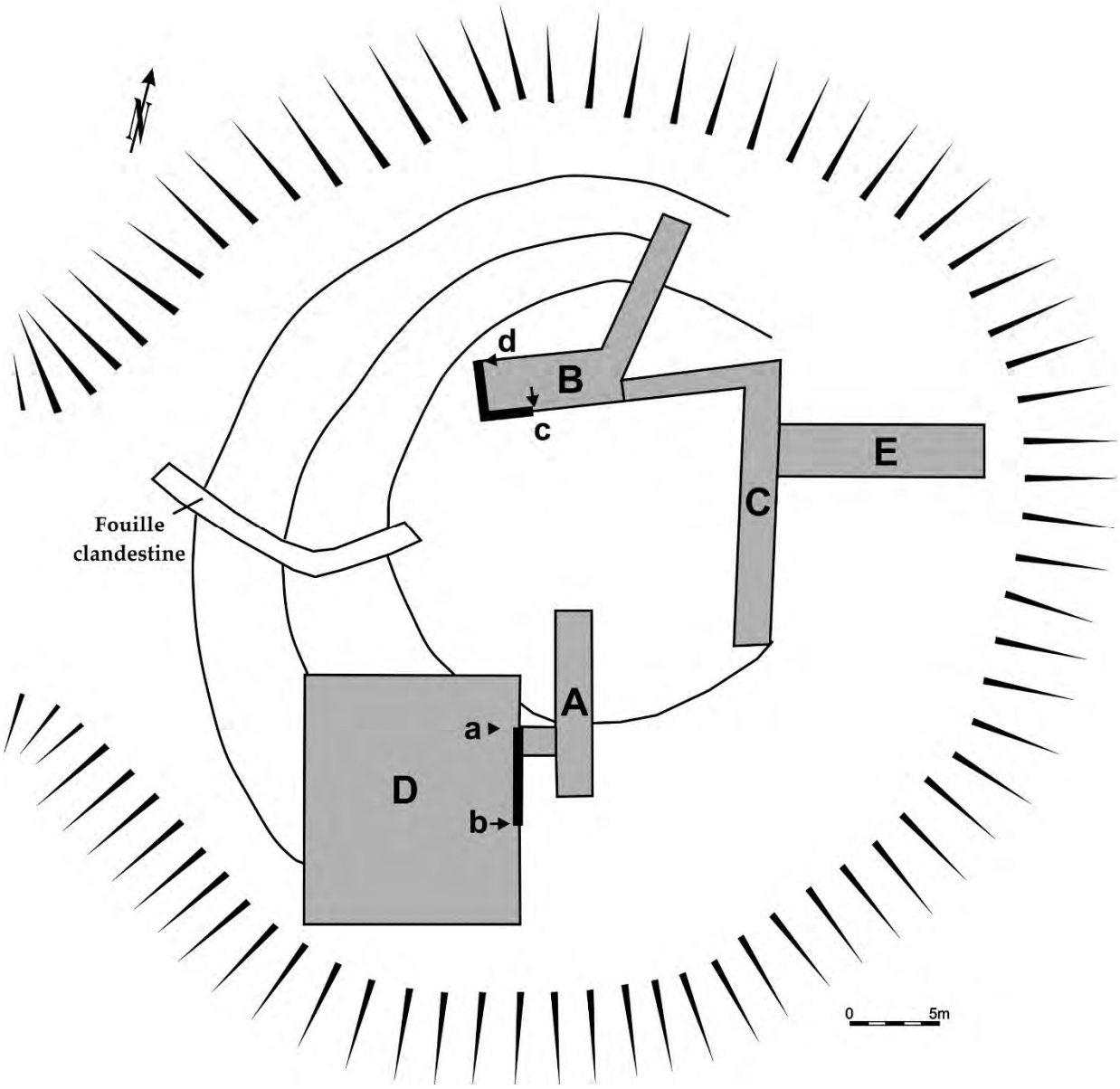


Fig. 4. Le plan des fouilles archéologiques d'Atmageaua Tătărască (redessiné d'après le plan dans l'archive).
Planul săpăturilor arheologice de la Atmageaua Tătărască (redesenat după planul din arhivă).

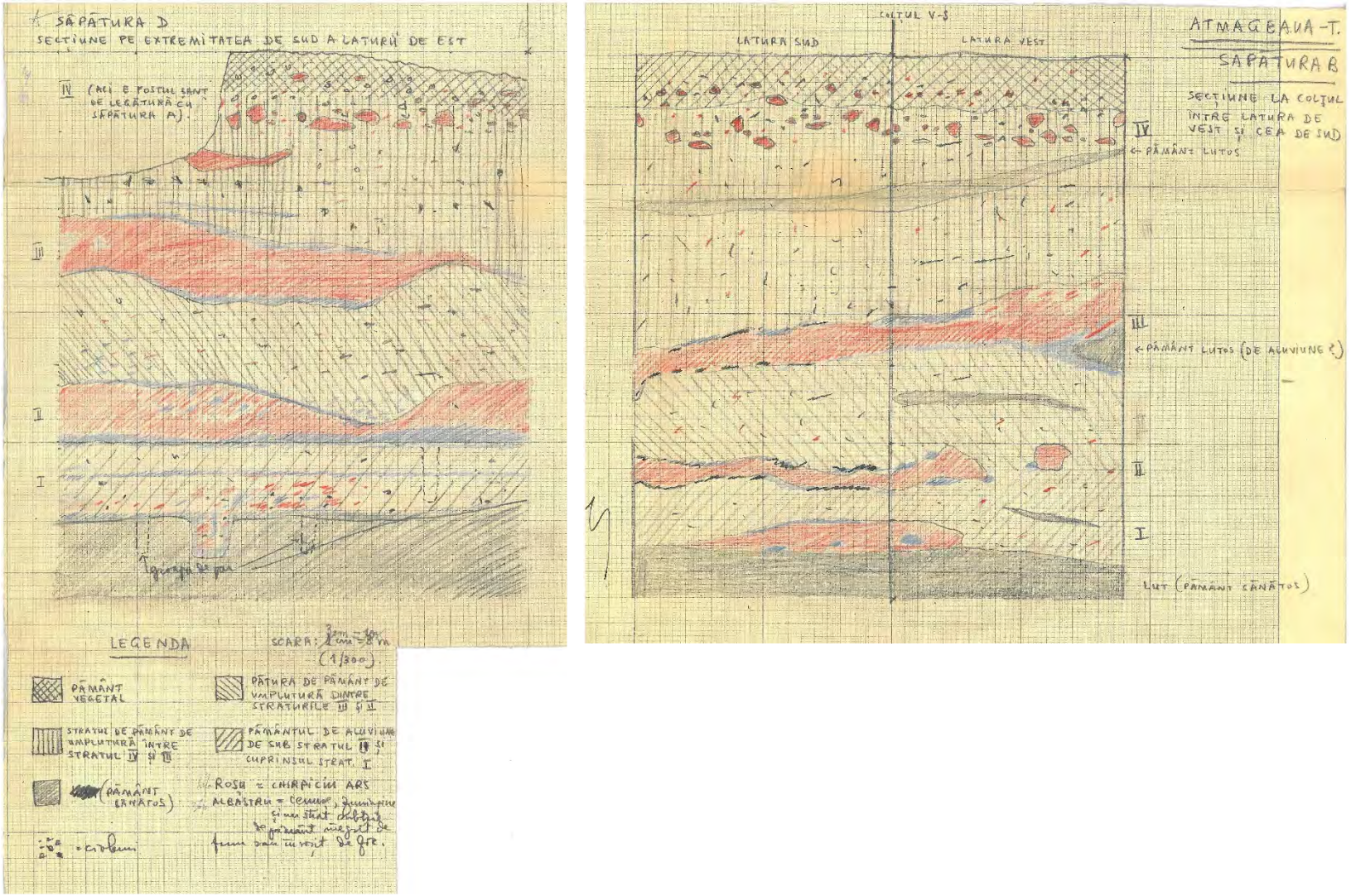


Fig. 5. Des dessins des profils stratigraphiques (l'archive d'Atmageaua Tătărască).
Desene ale unor profile stratigrafice (arhiva Atmageaua Tătărască).

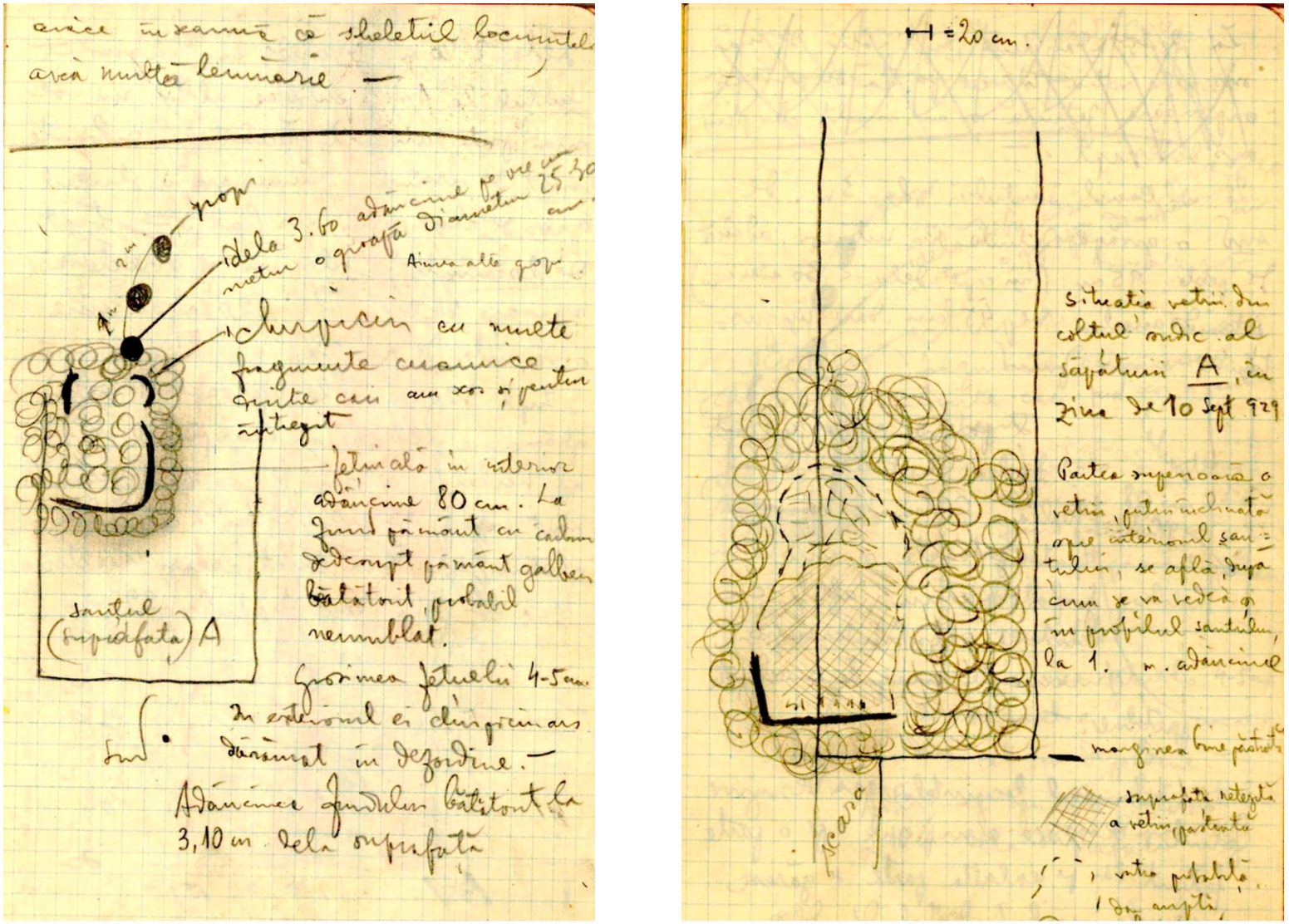


Fig. 6. Des pages de journal de fouilles de Vladimir Dumitrescu (l'archive d'Atmageaua Tătărască).
Pagini din jurnalul de săpătură al lui Vladimir Dumitrescu (arhiva Atmageaua Tătărască).

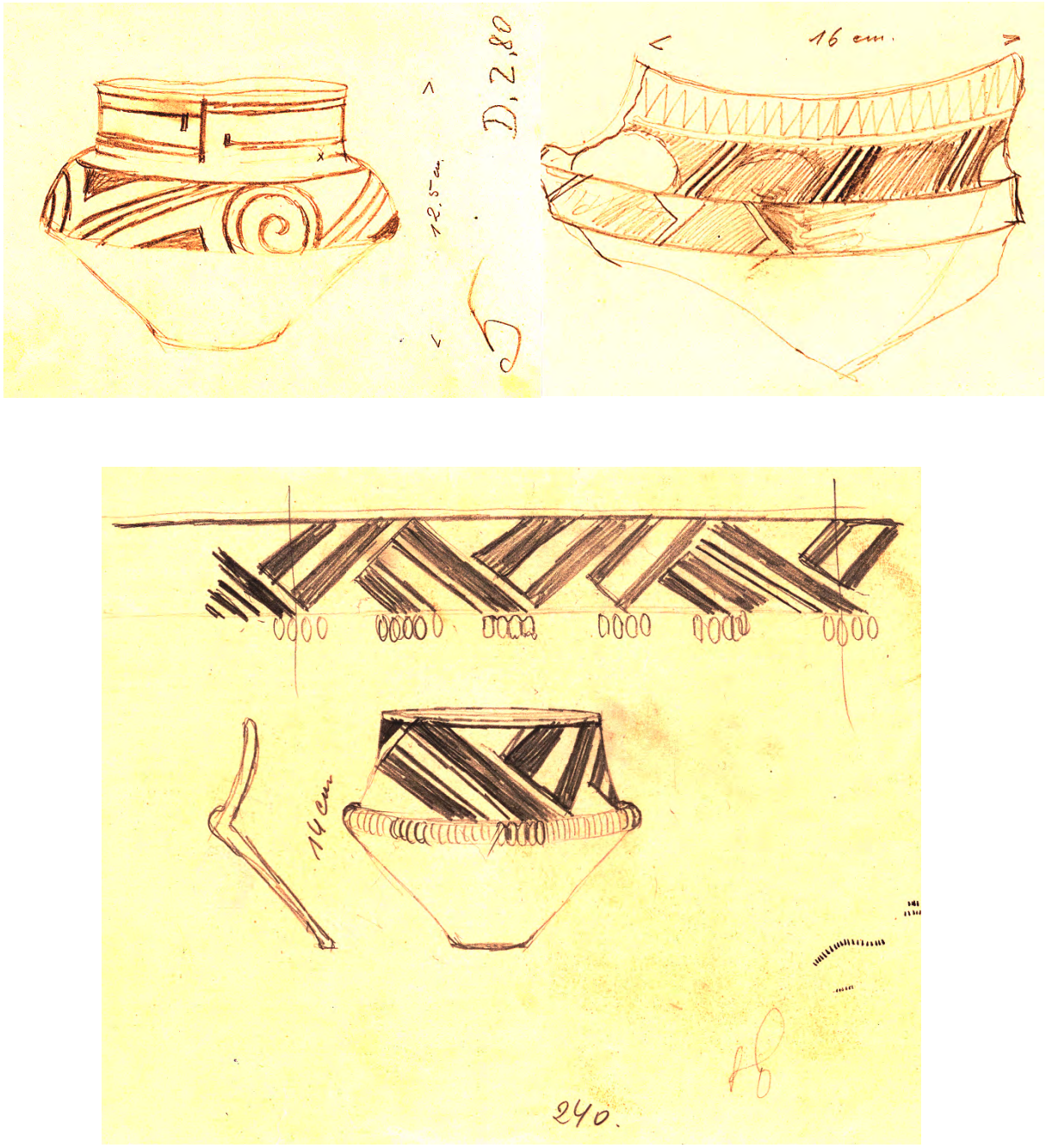


Fig. 7. Des dessins des tessons (l'archive d'Atmageaua Tătărască).
Desene ale unor fragmente ceramice (arhiva Atmageaua Tătărască).

THE PAINTED DECORATION OF THE POTTERY FROM THE ENEOLITHIC STATION NEAR ATMAGEAUA-TĂTĂRASCĂ

(Department of Durostor, Dobrogea, Rumania) [1]

By VLADIMIR DUMITRESCU

WITH PLATES I-V

The eneolithic station discovered near the village Atmageaua-Tătărască —with which I have already had the opportunity to occupy myself [2]— belongs, in a general way, to the balkano-danubian civilisation of the Gumelnița type.[3] Consequently, it cannot be included within the area of genuine painted pottery,[4] the painting, although one of the important elements of the pottery ornamentation in the Gumelnița civilisation, not being its most characteristic feature. In fact, though painting is indeed seldom absent from the ceramic decoration of the settlements belonging to the Gumelnița civilisation, relief ornament, and particularly incised ornament, is always found in greater quantity and greater variety, and may thus be considered the essential factor.

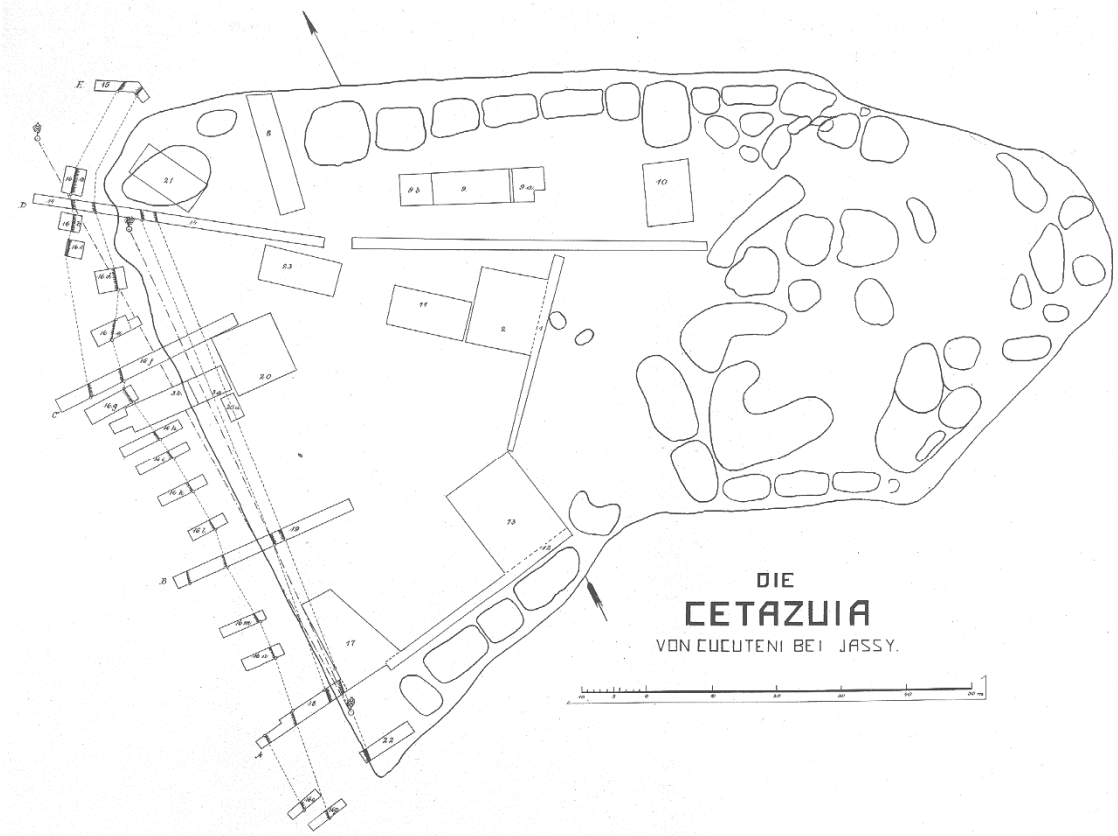
1. This question was the subject of a paper I presented at the second session of the International Congress of prehistoric and protohistoric Sciences from Oslo (August 3-9, 1936).

2. The detailed report of the excavations pursued in the years 1929-1935 at Atmageaua-Tătărască will be issued in vol. IV-VI (1935-1936) of the year-book *Dacia, recherches et découvertes archéologiques en Roumanie*. The stratigraphy of this station and its importance for the stratigraphy of the neo-eneolithic balkano-danubian civilisation was treated in a communication made at the first sitting of the International Congress of Prehistoric Sciences (cf. Vladimir Dumitrescu, 'La stratigraphie des stations appartenant à la civilisation énéolithique balkano-danubienne, à la lumière des fouilles de Atmageaua-Tătărască,' in *Proceedings of the First International Congress of Prehistoric and Protohistoric Sciences*, London, 1934, pp. 208-209, and in *Istros, revue roumaine d'archéologie et d'histoire ancienne*, I (Bucarest, 1934), I, pp. 37-43). Incidentally, certain discoveries from Atmagea were discussed in my articles 'A propos de la peinture de quelques vases de Gumelnița' (in *Revista Istorică Română*, I, pp. 403-415), and 'Betrachtungen über die "Steckdosen" der rumänisch-bulgarischen Boian *A*-Kultur,' in *W.P.Z.*, XXIII, 1936, pp. 142-150.

3. This neo-eneolithic civilisation, formerly known as the civilisation of the Bulgarian tells, has since been named the Gumelnița civilisation, after the settlement in Wallachia (excavated by myself, in 1925), where precise stratigraphic observations were first made (cf. Vladimir Dumitrescu, 'Fouilles de Gumelnița,' in *Dacia*, II, 1925, pp. 29-103).

4. C. Schuchhardt, in his *Alteuropa*, third ed. (Berlin-Leipzig, 1935), still includes in the same chapter and in the same culture belt, beside Cucuteni-Tripolje, the Balkano-Danubian civilisation of the Gumelnița type; which is in fact an error, as these are—in spite of their connexions—two distinct civilisations, the Gumelnița, at any rate, being not essentially a civilisation of painted pottery. And, obviously, the Boian *A* civilisation can even less be considered as such.

Fig. 8. Article publié par Vladimir Dumitrescu sur le *tell* d' Atmageaua Tătărască (Vl. Dumitrescu 1937).
Articol publicat de Vladimir Dumitrescu cu privire la *tell*-ul de la Atmageaua Tătărască (Vl. Dumitrescu 1937).



Plan I. Ausgrabungen von 1909, aufgenommen mit dem Gesamtplan von Ingenieur Savul, Jassy (Graben 1—11), ergänzt nach den Ausgrabungen von 1910 u. den Aufnahmen von H. Schmidt u. G. Bersu (Graben 12—21 mit den Schnitten 14 = D, 15 = E, 16 a—e, 16 f = C, 16 g—p, 18 = A, 19 = B. Vgl. Vorl. Bericht S. 584 ff.

Beilage 1

Fig. 9. Le plan de fouilles archéologiques fait par Hubert Schmidt à Cucuteni sur quelle sont dessines aussi les surfaces irréguliers fouilles par les « passionnés d'antiquités » (après H. Schmidt 1932, Plan I).
Planul săpăturilor lui Hubert Schmidt de la Cucuteni, pe care au fost trecute și suprafețele neregulate săpate de «pasionații de antichități» (după H. Schmidt 1932, Plan I).

On the so-called "Kriva Reka type" of Ludogorie chert: a petrographic perspective from the Upper Palaeolithic sites in the Giurgiu-Călăraşi area (southern Romania)

Alexandru CIORNEI*

Abstract: *The Southern Carpathians and the Balkan Mountains define a broad physiographic area, placed at the centre of current debates on the emergence of the earliest Upper Palaeolithic and the Aurignacian technocomplex, the migration and dispersal routes of Anatomically Modern Humans in Europe, and the pre-Neolithic and the neolithization of the Balkan area. In this archaeological context and state of research, the Upper Palaeolithic sites from the Lower Danube Valley represent a relevant piece in the jigsaw puzzle of past human land use and mobility patterns. The aim of this article is to investigate the similarity between intraclastic-bioclastic cherts from Giurgiu-Călăraşi area and "Kriva Reka" type of Ludogorie chert from NE Bulgaria, by focusing on their macroscopic and microscopic traits and their geological contexts. The distribution of eluvial and primary deposits of Ludogorie chert types from NE Bulgaria reflects the sedimentary facies belts of the Lower Cretaceous Sea. Also, the alluvial deposits reveal the role played by rivers in the erosion, transport, and redeposition further and further away of the Ludogorie cherts, thus generating an extended area abundant in such materials. The geological distribution of Kriva Reka type similar cherts in Romania was confirmed in alluvial deposits around Giurgiu (Frăteşti Formation, Lower Pleistocene, and Danube's lower terrace deposits, Upper Pleistocene). The archaeological distribution was confirmed in the Upper Palaeolithic open-air sites from Giurgiu-Malu Roşu, Slobozia-Râpa Bulgarilor, and Nicolae Bălcescu-La Vii. Their use by Boian and Gumelniţa Neolithic communities from southern Romania suggests a long time exploitation of local available cherts.*

Rezumat: *Carpaţii Meridionali şi Munţii Balcani definesc o arie fiziografică largă, plasată în centrul dezbaterilor curente asupra apariţiei Paleoliticului superior incipient şi a tehnocomplexului aurignacian, asupra rutelor de migraţie şi dispersie în Europa a oamenilor anatomic moderni, şi asupra pre-neoliticului şi neolitizării zonei balcanice. În acest context arheologic şi în stadiul actual al cercetării, siturile aparţinând Paleoliticului superior de pe Valea Dunării inferioare reprezintă o parte importantă în reconstituirea trecutului uman privind utilizarea teritoriului şi a tiparelor de mobilitate. Scopul acestui articol este de a investiga similaritatea dintre silicolitele intraclastic-bioclastice din zona Giurgiu-Călăraşi şi tipul Kriva Reka de silicolit Ludogorie din NE Bulgariei, concentrându-se pe caracteristicile macro- şi microscopice şi pe contextul lor geologic. Investigaţia contextului geologic a pus în evidenţă faptul că distribuţia depozitelor eluviale şi primare ale silicolitelor Ludogorie din NE Bulgariei reflectă zonele de facies sedimentar ale mării din Cretacicul inferior. De asemenea, distribuţia depozitelor aluviale denotă rolul jucat de râuri în eroziunea, transportul şi resedimentarea din ce în ce mai îndepărtată a silicolitelor Ludogorie, generând astfel o largă şi bogată zonă în astfel de materiale silicioase. Distribuţia geologică a silicolitelor similare celor de tip Kriva Reka în România a fost confirmată în depozite aluviale din zona Giurgiu (Formaţiunea de Frăteşti, Pleistocen inferior, şi depozitele de terasă ale Dunării, Pleistocen superior), în timp ce distribuţia arheologică a acestora a fost confirmată în aşezările în aer liber din Paleoliticul superior de la Giurgiu-Malu Roşu, Slobozia-Râpa Bulgarilor şi Nicolae Bălcescu-La Vii. Utilizarea acestora de către comunităţile neolitice de tip Boian şi Gumelniţa din sudul României sugerează exploatarea silicolitelor din surse locale de-a lungul unei lungi perioade de timp.*

Keywords: *intraclastic-bioclastic cherts, Kriva Reka type, Ludogorie chert, microfacies analysis, Upper Palaeolithic, Lower Danube Valley, southern Romania, northeastern Bulgaria.*

Cuvinte cheie: *silicolite intraclastic-bioclastice, tipul Kriva Reka, silicolit Ludogorie, analiză de microfacies, Paleolitic superior, Valea Dunării inferioare, sudul României, nord-estul Bulgariei.*

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◈ 1. Introduction

In the last two decades, world-wide Palaeolithic research has seen a growing body of papers and research projects focused on chert characterization and provenance in variable, more or less regional geographical, geological, and archaeological contexts, mainly employing, beside macroscopic features, petrographic microscopy or geochemical analyses as investigation tools. But this growth/progress is uneven across European countries.

The Southern Carpathians and the Balkan Mountains define a broad physiographic area, placed at the centre of current debates on the emergence of the earliest Upper Palaeolithic and the Aurignacian technocomplex (N. Teyssandier 2006, p. 10-14; N. Sirakov *et alii* 2007; T. Tsanova 2008, p. 215-227; 2012, p. 227-230; T. Tsanova *et alii* 2012, p. 492-495; V. Sitlivy *et alii* 2012, p. 124-127; Ch. Schmidt *et alii* 2013, p. 3741; M. Anghelinu, L. Niţă 2014, p. 173-189; V. Sitlivy *et alii* 2014a, p. 273-274; 2014b, p. 208-210), on the migration and dispersal routes of Anatomically Modern Humans in Europe (J.K. Kozlowski 1979, p. 77-78; N.J. Conard, M. Bolus 2003, p. 333; E. Trinkaus *et alii* 2003a, p. 11235; 2003b, p. 252-253; P. Mellars 2004, p. 463; 2006, p. 933; H. Rougier *et alii* 2007, p. 1169-1170; R. Iovita *et alii* 2013, p. 99; S. Ivanova *et alii* 2012, p. 1-5), but also the pre-Neolithic and the neolithization of the Balkan area (J.K. Kozlowski 2004; E. Marinova, R. Krauss 2014; M. Gurova, C. Bonsall 2014a; 2014b).

Despite these intense debates and the importance of the subjects, we are faced with a rather meagre and uneven archaeological tableau regarding the Palaeolithic findings in the area between the Southern Carpathians, the Danube and up to the Black Sea. The Lower and Middle Palaeolithic sites and findings with secure contexts are rather limited to specific landscapes (the Southern Carpathians caves, Getic plateau, Dobrudja) and missing or very doubtful in the rest of the area (Al. Păunescu 1999, p. 28-33; 2000, p. 40-43; A. Doboş 2008, p. 218-227, fig. 2; R. Iovita *et alii* 2013, p. 103-111). The scattered distribution of Upper Palaeolithic (UP) sites and fortuitous findings (fig. 1) give an incomplete picture about the human occupations for this period. This scattered spatial repartition is partially related to geological conditions during the occupational moments (influencing the settlement patterns of UP humans), but mainly to more recent geological ones (landscape changes during the late Upper Pleistocene and Holocene covering or destroying UP sites) and uneven archaeological research mainly concentrated on cave sites or evident raw material sources (M. Anghelinu, L. Niţă 2014, p. 174).

Added to these, the cultural and chronological contexts of UP sites (Al. Păunescu 1999, p. 33-38; 2000, p. 43-52; Em. Alexandrescu 2009: 19-22; M. Anghelinu, L. Niţă 2014, p. 181-187; A. Tuffreau *et alii* 2014, p. 280-281; R. Dobrescu *et alii* 2015, p. 31) increases the fragmentation of the archaeological landscape and thus its potential for a regional-scale analysis. More so, the basic raw materials identification performed for these UP sites (C.S. Nicolăescu-Plopşor *et alii* 1956, p. 225; Em. Protopopescu-Pache, C.N. Mateescu 1959, p. 13; D. Popescu *et alii* 1961, p. 633; Fl. Mogoşanu, M. Bitiri 1961, p. 219; Fl. Mogoşanu 1964, p. 337; C.N. Mateescu 1970, p. 69; V. Boroneanţ, I. Vlad 1979, p. 26; V. Boroneanţ *et alii* 1983, p. 15; Al. Păunescu 1999, p. 92-93, 93-102, 132, 202-208, 121-124, 215-220, 196-200; M. Cârciumaru *et alii* 2000, p. 51; Al. Păunescu 1999-2000, p. 28, 30; 2000, p. 323) seem to indicate the overwhelming exploitation of local sources, while the provenance of "exotic" materials hasn't been determined or proven consistently. Thus, the suggested raw material supply pattern is one adapted for the local environment and conditions (also related to specific time periods). These restrictions do not imply a lack of communication and circulation paths between UP populations, but additional criteria (consistently applied) should be used to underline those patterns which eluded the past chrono-cultural pursuit (such as raw material

supply patterns, raw materials circulation). In the above sketched archaeological context and in current state of research, the UP sites from the Lower Danube Valley (fig. 1) represent a spatially restricted, but relevant piece in the jigsaw puzzle of past human land use and mobility patterns for this area.

Recent developments in petro-archaeological research (M. Gurova, Ch. Nachev 2008; C. Bonsall *et alii* 2010; P. Andreeva *et alii* 2014; Al. Ciornei 2013; Al. Ciornei *et alii* 2014) permit the investigation of potential connections between Romanian chert[1] types from the Lower Danube Valley and those from the northern and north-eastern Bulgaria.

◈ 2. Short overview of the archaeological and research contexts

Despite the constant efforts towards a coherent cultural and chronological evolution model of UP sites from the Lower Danube Valley (Al. Păunescu 2000, p. 43-52; Em. Alexandrescu 1997; 2000; 2009, p. 19-20), their raw material supply strategies and land use can only be discussed isolated and diachronically, given the long time span covered by these sites and the technological and typological differences (A. Tuffreau *et alii* 2014, p. 280-281; M. Anghelinu, L. Niţă 2014, p. 181-185).

The current study is focused on three Upper Palaeolithic open-air sites found within loess and loess-like deposits (A. Conea 1970, p. 64, 65-fig. 11; L. Badea 1997, p. 11; D.C. Jipa 2014, fig. 5) from the Danube's terraces in Giurgiu-Călăraşi area: Giurgiu-Malu Roşu (GMR), Slobozia-Râpa Bulgarilor (Sl-RB) and Nicolae Bălcescu-La Vii (NB-Vii) (fig. 1, tab. 1).

Sites	Archaeological investigations	Archaeo-logical levels	Absolute dates	Lithic pieces
Giurgiu-Malu Roşu	discovered in 1952 during a field survey by Gh. Rădulescu and M. Ionescu; field survey in 1954 by C. S. Nicolăescu-Plopşor, E. Comşa, Al. Păunescu and P. Diaconu; systematic excavation by Al. Păunescu, Gh. Răduelscu and M. Ionescu (1958-1959, 1960); excavations by Al. Păunescu and Em. Alexandrescu (1992-1996); excavations coordinated by Em. Alexandrescu (1998-2004);	bed AII -1.35-1.50 m bed AI level AIc -1.80-2.25 m level AIb -2.25-2.45 m level AIa -2.45-2.85 m sterile -2.90 m	- - 21140±120 BP 22790±130 BP 27±3 ka BP	40000 to 60000
Slobozia-Râpa Bulgarilor	field survey by Al. Păunescu (1959); excavations by Al. Păunescu and M. Ionescu (1960);	-1.06-1.20 m	-	12
Nicolae Bălcescu-La Vii	excavations by M. Munteanu (1987, 1990, 1993); excavations coordinated by Al. Păunescu and Em. Alexandrescu (1995-1996);	-0.30-0.60 m	-	309

Tab. 1. The Upper Palaeolithic sites from Giurgiu-Călăraşi area.
Aşezările Paleoliticului superior din zona Giurgiu-Călăraşi.

[1] Chert is used here with its general geological meaning encompassing all sedimentary siliceous rocks.

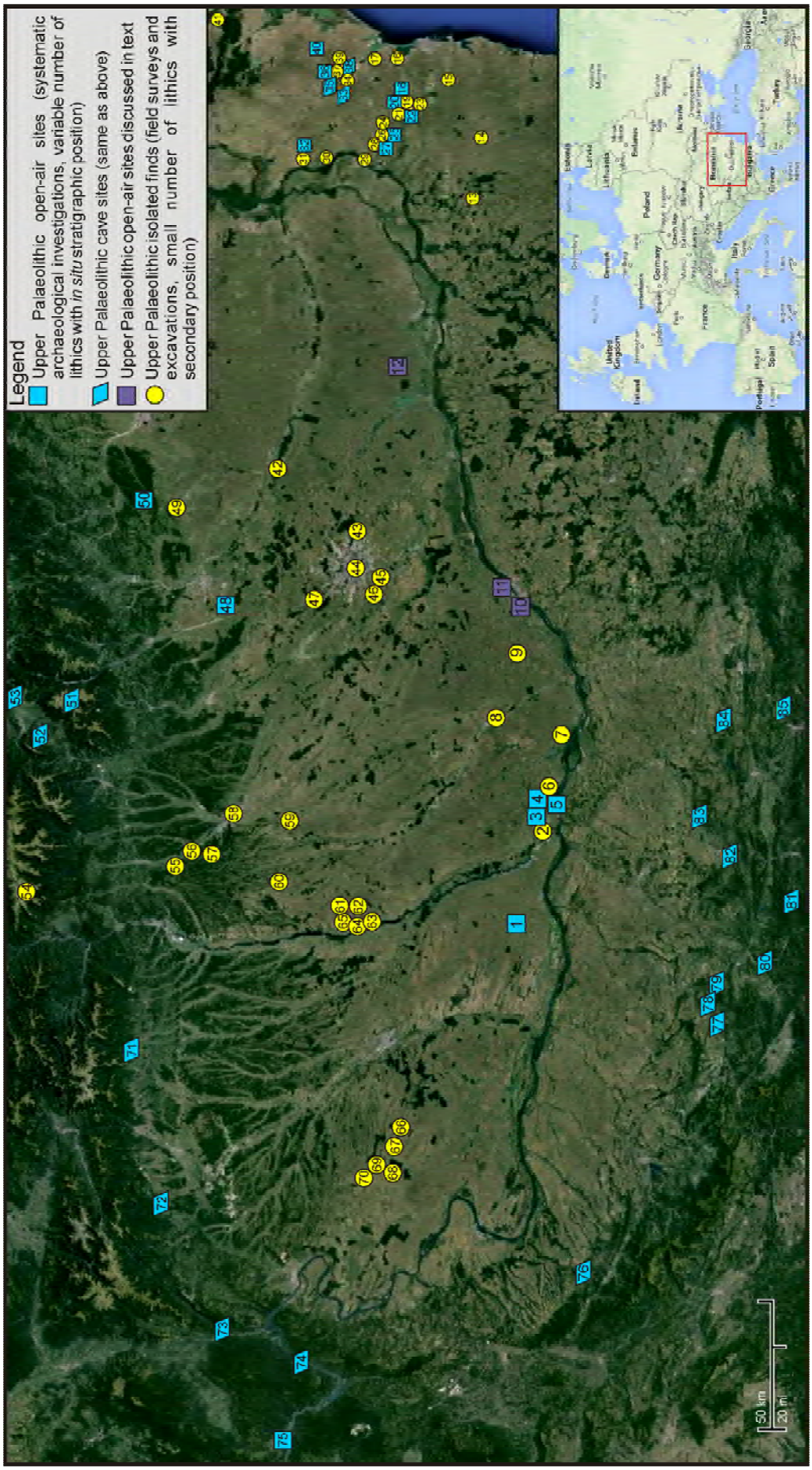
Legend
Upper Palaeolithic open-air sites (systematic archaeological investigations, variable number of lithics with *in situ* stratigraphic position)
Upper Palaeolithic cave sites (same as above)
Upper Palaeolithic open-air sites discussed in text
Upper Palaeolithic isolated finds (field surveys and excavations, small number of lithics with secondary position)
50 km
20 mi

Fig. 1. Upper Palaeolithic sites and isolated discoveries in the area between the Southern Carpathians and the Balkan Mountains (Southern Romania and Northern Bulgaria); sites in Romania were plotted after Al. Păunescu (1999; 2000; 2001); sites from Bulgaria were mapped in accordance with information from N. Džambazov (1981), S. Ivanova, S. Sirakova (1995), T. Tsanova (2006; 2008); map support from https://maps.google.ro. Locations on the map: 1. Vădastra-Măgura Fetelor; 2. Turnu Măgurele-Odaia; 3. Ciuperceni-La Tir; 4. Ciuperceni-La Vii; 5 Poiana-La NE de sat; 6. Traian-La NV de sat; 7 Fântânele-La Tudorcea and Fântânele-La Movilă; 8. Alexandria-Poroschia; 9. Drăghiceanu-Fundul Drăghiceanului; **10. Slobozia-Râpa Bulgarilor; 11. Giurgiu-Malu Roşu; 12. Nicolae Bălcescu-La Vii**; 13. Văleni-Lângă cimitir; 14. Conacu-La VNV de sat; 15. Straja-La dig la Stănişor; 16. Lumina-Pensinsula Punct II; 17. Sibioara-La NNV de livada cu pruni; 18. Castelu-Dealu Castelu Punctul II and Castelu-La Cărămidărie; 19. Castelu-Dealu Castelu Punctul III; 20. Cuza Vodă-Cariera Veche de lângă pădure and Cuza Vodă-Marginea de E a carierei „Caolinul Medgidia"; 21. Cuza Vodă-Cariera Veche; 22. Medgidia-La ESE de Gara Veche; 23. Medgidia-Cariera nouă a Fabricii de Ciment and Medgidia-Curtea uzinei IMUM; 24. Tortoman-La SE de sat; 25. Gherghina-La Cariera veche; 26. Gherghina-Cariera de Humă; 27. Ţibrinu-Malul stâng al lacului Punctul III, Ţibrinu-Malul stâng al lacului Punctul IA and Ţibrinu-La marginea de SE a satului Punctul V; 28. Ţibrinu-Malul stâng al lacului Punctul II, Ţibrinu-Malul stâng al lacului Punctul III, Ţibrinu-Malul stâng al lacului Punctul IIIA, and Ţibrinu-Malul stâng al lacului Punctul IIIB; 29. Seimeni-La Silişte, Seimeni-Fântâna lui Dinu Ciorbaru, and Seimeni-Izlazul lui Gherlan; 30. Topalu-Peştera din carierele de piatră; 32. Tichileşti-La S de Cariera Veche; 32. Tichileşti-La Cariera Veche; 33. Târguşor-Peştera La Adam; 34. Târguşor-La Saivane; 35. Cheia-Peştera Bursucilor and Cheia-Peştera „Cheia la Izvor"; 36. Casian-La 2 km S; 37. Casian-La 2 km SSE; 38. Gura Dobrogei-Peştera „Adăpostul rândunelelor"; 39. Gura Dobrogei-Vatra satului; 40. Tariverde-Pe Islaz and Tariverde-La S de sat; 41. Babadag-La N şi NE; 42. Coşereni; 43. Cernica; 44. Bucureşti-Arhivele Statului; 45. Alunişu-Gherman; 46. Bragadiru; 47. Buftea-Cârna-Măneşti; 48. Târgşoru Vechi-Curtea Domnească; 49. Vadu Săpat-Valea Budureasca; 50. Lapoş-Poiana Roman; 51. Dobreşti-Peştera Mică; 52. Peştera-Moeciu-Peştera Mare (Liliecilor), Peştera-Moeciu-Peştera Mică, and Peştera-Moeciu-Peştera Valea Coacăzii; 53. Râşnov-Peştera Gura Cheii; 54. Arefu-Şaua Serbota; 55. Tutana; 56. Malu Vânăt-Merişani; 57. Drăganu-Olteni; 58. Piteşti; 59. Costeşti-La 1,5 km în avale de podul CFR; 60. Vineţi; 61. Valea Mare; 62. Valea Mare-Recea; 63. Milcovu din Vale; 64. Slatina-Clocociov; 65. Slatina-Cireaşov, 66. Bechet; 67. Cleanov-Pe terasa Desnăţuiului and Cleanov-Dealu Fiera; 68. Suharu; 69. Verbiţa; 70. Gvardiniţa-Buzata; 71. Baia de Fier-Peştera Muierii; 72. Boroşteni-Peştera Cioarei; 73. Băile Herculane-Peştera Hoţilor; 74. Dubova-Peştera lui Climente; 75. Gornea-Dealu Păzărişte and Gornea-Vodneac; 76. Kozarnica; 77. Pešt; 78. Samuillica II; 79. Temnata Doupka; 80. Morovitsa; 81. Topliya; 82. Vasil Levski; 83. Devetaška; 84. Emenskata; 85. Bacho Kiro.

Situri şi descoperiri izolate din Paleoliticul superior în zona dintre Carpaţii Meridionali şi Munţii Balcani.

The study area covers a part of the Muntenia region in southern Romania: the segment of the Lower Danube Valley between East of the Vedea River and East of the Mostiştea Valley, not extending beyond the northern limit of Danube's valley (that is the geomorphologic contact between the Danube's terrace plain and the high plain) and the river's water line. The Danube flows through an asymmetric contact valley between the Romanian Plain (89-95 m absolute altitude) and the Danubian Hilly Plain/Danubian Plain (500 m absolute altitude) (P.V. Coteţ 1969, p. 25-26; Mateescu *et alii* 1969, p. 532; Gh. Niculescu, V. Senecu 1969, p. 40; P.V. Coteţ 1976, p. 96-98; Gr. Posea 2006, p. 92; I. Zagorchev

2009, p. 984-986; K. Stoyanov, Em. Gachev 2012, p. 380). The Romanian side of the Lower Danube Valley gently descends towards the water line and is composed of four terraces (40-20 m to 10-4 m relative elevation) and the floodplain (N. Oncescu 1965, p. 126, 136; P.V. Coteţ 1976, p. 96-98; Gr. Posea 2006, p. 92). The Bulgarian side of the Lower Danube Valley is tilted and formed by cliffs of 50-200 m elevation, with three terraces of 35-15 m relative elevation in the area between Ruse and Silistra (K. Stoyanov, Em. Gachev 2012, p. 380).

GMR is located at the ENE periphery of Giurgiu city (Giurgiu county, southern Romania), on the lower terrace of the Danube. From a technological and typological point of view (Al. Păunescu 2000, p. 277), the lithic assemblages were considered to indicate "very late/evolved Aurignacian" (Al. Păunescu, Em. Alexandrescu 1997a, p. 22; 1997b, p. 26; Al. Păunescu 2000, p. 283) or "Epiaurignacian" cultural traditions (Em. Alexandrescu 2009, p. 9-18), from around 23000 BP (for level AIa) down to 17-16000 BP (level AII). Early archaeological research at GMR site determined flint[2] as the main raw material knapped by Palaeolithic people. C.S. Nicolăescu-Plopşor *et alii* (1956, p. 225) described this flint as being a "bluish-grey colour – more or less darker – coarse granulated, low quality raw material", many of the flakes preserving the "limestone crust, without the slightest trace of rolling". Subsequent archaeological investigations from 1958-1960 and 1992-2004 (Al. Păunescu *et alii* 1962, p. 130; 1964, p. 109; Al. Păunescu, Em. Alexandrescu 1997b, p. 25; Al. Păunescu 2000, p. 276; Em. Alexandrescu 1996-1998, p. 47-48; Em. Alexandrescu, T. Popa 1996-1998, p. 64; Em. Alexandrescu *et alii* 2004, p. 413; 2007, p. 97) pointed out that the "bluish-grey and dark blue coarse granulated flint" (or "greyish flint with blue shades and small whitish speckles"/"silex A" category) represents the main raw material (over 70%), followed subordinately by the "yellowish-brown flint" (or "silex M" category/"Frăteşti type flint"), while other rock types ("fine-grained grey flint with glassy lustre", jasper, siliceous sandstone, quartzite and quartz sandstone, black schist, opal, andesite) were used in "negligible" amounts.

According to Em. Alexandrescu, B. Soare (2009, p. 55-56) chert samples from Malu Roşu site are macroscopically characterized by massive and compact appearance, strongly cemented, elevated hardness, conchoidal fracture, various colours (white, cream, red, grey, dark grey to almost black), waxy to glassy lustre, with a 1 mm thick white crust. The microscopic analysis and X-ray diffraction revealed that the predominant mineral phase is quartz, subordinately followed by chalcedony (as radial aggregates), moganite (rare), and carbonates (calcite, dolomite). These flints contain echinoderm plates, carbonate and/or siliceous foraminifera, and xenomorph opaque material. Based on this petrographic description and correlated with technological features (i.e. large quantity of reduction by-products, chaotic reduction of the material, low amounts of blades and atypical morphology of tools), Em. Alexandrescu, B. Soare (2009, p. 56) concluded, as previously pointed out by C.S. Nicolăescu-Plopşor *et alii* (1956, p. 225), that Malu Roşu cherts are low quality raw materials. This recent petrographic study, oriented towards mineralogy and not primary constituents, lacking any kind of sedimentological implications of the identified microfauna and other constituents, and representing a generalized description, failed to recognize the existence of different types of cherts inside the lithic assemblage.

[2] Flint is used here as translation for "silex" from the Romanian archaeological literature, a term that refers to fine-grained siliceous materials with conchoidal fracture, in many cases including materials other than the Upper Cretaceous material known as flint in other countries.

Sl-RB (Giurgiu county) is located on the same lower terrace of Danube. The lithics in this site are knapped from the same raw materials and have the same technological and typological traits as those from GMR (Al. Păunescu *et alii* 1962, p. 135-138; 1964, p. 109; Al. Păunescu 2000, p. 285-286).

Sites	Raw materials provenance	References
Giurgiu-Malu Roşu	- "Danube's gavels […] rich in flint […] originating in the prebalkan platform, in the Cretaceous deposits"	C.S. Nicolăescu-Plopşor *et alii* 1956, p. 225
	- "in gravel quarries of the Lower Anthropozoic deposits at Daia, Frătești, Bălănoaia, Ghizdaru, with abundant flint pebbles with south Danube origin"	
	- "from the host-rock deposit and the natural openings of such deposits […] South of Danube"	
	- "near the site and that is across the Danube, from the prebalkan platform"	Al. Păunescu *et alii* 1962, p. 130
	"specific to Lower Danube Valley"*	Al. Păunescu, Em. Alexandrescu 1997b, p. 25
	- "somewhere in Danube's minor riverbed from that time"	Em. Alexandrescu 1996-1998, p. 33, 47-48
	- "in Frătești Gravels"**	
	- "alluvial sediments of the terrace they've lived on or from a nearby area"**	Al. Păunescu 2000, p. 57
Nicolae Bălcescu-La Vii	- "from the right side of Danube […] from the Moesian Platform"	Al. Păunescu, Em. Alexandrescu 1997c, p. 62

* The petrographic analysis carried out by Clarissa Papacostea (Al. Păunescu 1970, p. 218-219; Al. Păunescu, Em. Alexandrescu 1997b, p. 25) on a sample of "greyish flint with blue shades and small whitish speckles" revealed that this material has: a microcrystalline spherulitic structure; compact texture; fundamental mass composed of "cryptocrystalline silica represented by equal amounts of crystalline quartz, fibrous chalcedony with fibroradial structure"; "formations with marginal grey tinted opaque appearance"; remnant calcite; partially or completely silicified calcareous organisms (echinoderms plates); sponge spicules preserved in silica (opal-filled axial channel); opal as separated small portions, yellow coloured and isotropic in polarized light.

** A yellowish-brown flint was identified by Al. Păunescu (2000, p. 57) through his field surveys of 1993-1995 in the "Frăteşti Gravels" exposed by modern quarrying activities some 7 to 10 km N and NW from GMR, where he observed "a great quantity of flint and quartzite natural pebbles (whole or broken), of variable sizes and weights". The provenance of the "greyish flint with blue shades and small whitish speckles" has not been established.

Tab. 2. Possible provenance of raw-materials from the Upper Palaeolithic sites.
Proveniența posibilă a materiilor prime din aşezările Paleoliticului superior.

NB-Vii (Nicolae Bălcescu village, Călăraşi county) is located on the right side of Gălăţui lake, on a lower terrace of Danube. The lithic assemblage is technologically and typologically similar to that of GMR (Al. Păunescu, Em. Alexandrescu 1997c, p. 60-63). The raw material is represented by brown, dark brown and brownish-grey Senonian flint (ca. 95%), and in a very small percentage (5%) by fine-gained brown and grey flint (Al. Păunescu, Em. Alexandrescu 1997c, p. 62).

In spite of some microscopic analyses carried out on samples from GMR (Al. Păunescu 1970, p. 218-219; Al. Păunescu, Em. Alexandrescu 1997b, p. 25; Em. Alexandrescu, B. Soare 2009, p. 55-56), the raw materials provenance was based on the researchers' personal experience with siliceous materials from different areas and limited land surveys. The supply sources with flint for GMR and Sl-RB sites were considered to be either nearby alluvial deposits found on the left side of Danube, or host-rock deposits found in Bulgaria (tab. 2). For NB-Vii site there were no petrographic investigations and no sources sought, and the provenance remained unknown (tab. 2).

◈ 3. Materials and methods

The materials from this study represent a batch of samples (comprising about 65 hand samples and 21 thin sections) extracted from the author's PhD research (Al. Ciornei 2013) on cherts in geological (Ghizdaru-Haltă Quarry, Giurgiu-South Western Quarry) and archaeological (Giurgiu-Malu Roşu, Nicolae Bălcescu-La Vii) contexts from the Lower Danube Valley, materials already published as a whole (Al. Ciornei *et alii* 2014).

The investigation of these cherts was done through macroscopic examination of hand specimens, optical microscopy, and bulk X-ray diffraction of uncovered thin sections. The basic macroscopic description was done with the naked eye; fresh breaks and chips were obtained with a small hammer; hand specimens were measured and weighed with standard measuring instruments. Macroscopic photographs were taken with a Nikon digital camera D40 (AF-S Nikkor 18-55 mm, 1: 3.5-5.6 GII ED). The microscopic analysis was conducted on an Olympus BH-2 petrographic microscope, using only 4× (A4 PO, 0.10, 160/-) and 10× (A10 PO, 0.25, 160/0.17) magnifications. Microscope photographs were taken with a Nikon COOLPIX 995 photomicrograph camera (Wide Field 10× and digital zoom of 3×). X-ray diffraction was conducted on a PANanalytical X'Pert θ/θ, CuK_α radiation, scan interval 2-55° 2θ, 10-56° 2θ, 15-70° 2θ, step size 0,0170°, scan step time 10 s.

The macroscopic examination of hand specimens had a two-fold aim: the external appearance (colour and consistency of cortex, naked eye visible fossils) and the internal look (fracture, light transmittance in thin flakes, lustre in fresh breaks, colour and play of colours, absence/presence and distribution of carbonate reminiscences, naked eye visible fossils). This examination allowed the separation of macroscopic varieties. The macroscopic variability was covered by thin sections prepared from the representative hand specimens.

Chert characterization in thin sections relied on the microfacies criteria for carbonate rocks (J.L. Wilson 1975; E. Flügel 2010): grain categories, amount, size, sorting, roundness, and mineralogy of grains; recognition of systematic fossil groups and petrographic fossil distribution (types, size, amount, and mineralogy of fossils); amount, texture, and mineralogy of the matrix; type, amount, texture, and mineralogy of cements. Amount of grains, matrix, and cement for each thin section were estimated by use of visual comparison charts (P.A. Scholle, D.S. Ulmer-Scholle 2003, p. xii). For all samples analyzed, traits indicating the diagenetic fabric were described through cumulative observations regarding dissolution fabrics, compaction (grain contacts), cementation (type and mineralogy of cements), and neomorphism. Depositional fabric for each thin section was inferred from the estimated amount of particles, matrix, cement, and also grain-support type and packing. The recorded mineralogy of each grain type, cement, and matrix represented the basis for estimated mineralogical composition in individual thin sections correlated with the X-ray diffraction patterns.

The results of the previous analysis (Al. Ciornei *et alii* 2014) were confronted with the results of microfacies analyses of carbonate rocks from Romania, a process which led to a revised interpretation of the chert microfacies (Section 4. 1.). A review of the geological information for the study area and the surroundings (regional geology), and the analysis of the geological context of the sampling locations allowed setting up the frame of the geological occurrence for the analyzed chert samples (Section 4. 2.). Also, it has been undertaken an assessment of the evidence regarding possible similar siliceous materials. This approach is based on a bibliographical review (qualitative text and image analysis of published macroscopic and microscopic descriptions, correlated with geological information) of the petro-archaeological record regarding raw materials from north-eastern Bulgaria (Section 4. 3.) and Neolithic sites in southern Romania (Section 4. 4.).

◈ 4. Results

4. 1. A revised interpretation: from peloidal to intraclastic-bioclastic cherts

Using the criteria mentioned in the previous section, seven "peloidal chert" microfacies were initially identified, representing cherts formed in shallow-marine carbonates. The thresholds used for microfacies differentiation are detailed elsewhere (Al. Ciornei 2013, p. 12-14; Al. Ciornei *et alii* 2014, p. 143-148), and they will not be reiterated here. In this revised presentation, beside those already established, one more microfacies was separated (sample NB-Vii [10], microfacies [11ab]) due to its different grains-size and slight microfauna composition in contrast to samples from microfacies [11a]. The main characteristics are summarized in captions of fig. 2-12 and tab. 3, 4.

The "peloidal cherts" have a relatively regular nodular or lenticular shape (from 5 to almost 20-30 cm long), various colours and shades (rusty brown to greyish-rosy or grey), with a rough and coarse appearance, dull, rarely greasy lustre (fig. 2, 3). Nodules retain both a coarse-granulated porous "fresh cortex" and a smooth rusty-brown or rusty-yellowish cortical surface (neocortex), traits that indicate reduced transport distances (compared with the initial limestone deposit) and long-time reworking by water (fig. 3).

These cherts are characterized by grain-supported depositional fabrics (tab. 3): packstones with fine to medium sand-sized grains (microfacies [10a], [10b], [11a], [11ab], [11b]) and grainstones with medium to coarse sand-sized grains (microfacies [12a], [12b], [12c]). They were called "peloidal cherts" (Al. Ciornei 2013, p. 13; Al. Ciornei *et alii* 2014, p. 143) because their primary constituents were identified as peloids: particles with round, ovoid, or rod-like shapes, with sizes between 70 to 850 μm, composed of microcrystalline quartz, chalcedony, megaquartz and micrite. Additional particles are non-skeletal grains (intraclasts, cortoids, ooids) and bioclast (fig. 4). In the working phase, the term peloids was used as defined by E. Flügel (2010, p. 110-111), i.e. a non-genetic term of ignorance which refers to micron- to millimetre-sized micritic grains, subrounded and rounded, but also ovoid and rod-like, without internal structures. During subsequent interpretation phases of the data, the peloids composed of microcrystalline quartz were identified as silicified mud peloids (fig. 4) and their inferred depositional setting considered as restricted inner shallow-marine (Al. Ciornei 2013; Al. Ciornei *et alii* 2014). Thus, it has been disregarded the distinction between small intraclasts and mud peloids (uniform shape, good sorting and an arbitrary size limit of 200 μm, E. Flügel 2010, p. 113) and additional characteristics of fine-grained peloidal limestones. All the peloids with microcrystalline quartz from these microfacies can be regarded as intraclasts (fig. 4). The fact that these genetically similar

particles were separated as peloids and intraclasts/lithoclasts (Al. Ciornei *et alii* 2014, p. 139) has outlined a bimodal composition of this category of grains, which were derived from diverse types of penecontemporary deposits.

Fig. 2. Macroscopic views of intraclastic-bioclastic cherts from Giurgiu-Malu Roşu: **1, 3.** "Bluish-grey and dark blue coarse granulated flint"; **2, 4.** Very translucent greyish and rosy variety; **5-8.** Rusty brown (5, 6, 8) and greyish-rosy (7) varieties; samples display "fresh cortex" (red arrows), water worn cortex (blue arrows), and neocortex (white arrows), that indicate alluvial sources containing clasts with different rolling intensities and transport distances from the original host-rocks; scales are 2.5 cm; photos by Al. Ciornei (2012).
Aspecte macroscopice ale silicolitelor intraclastic-bioclastice de la Giurgiu-Malu Roşu.

Fig. 3. Macroscopic views of intraclastic-bioclastic cherts from Ghizdaru-Haltă Quarry (1-7) and Giurgiu-South Western Quarry (8): variable colours from dark greyish (1), greyish-rosy (2), to rusty brown (3-8); samples display water worn cortex (blue arrows) and neocortex (white arrows) characteristic for alluvial deposits (such as Frăteşti Formation and Danube's lower terrace); scales are 2.5 cm; photos by Al. Ciornei (2011-2013).
Aspecte macroscopice ale silicolitelor intraclastic-bioclastice de la Ghizdaru-Cariera de la Haltă (1-7) şi Giurgiu-Cariera de la SV (8).

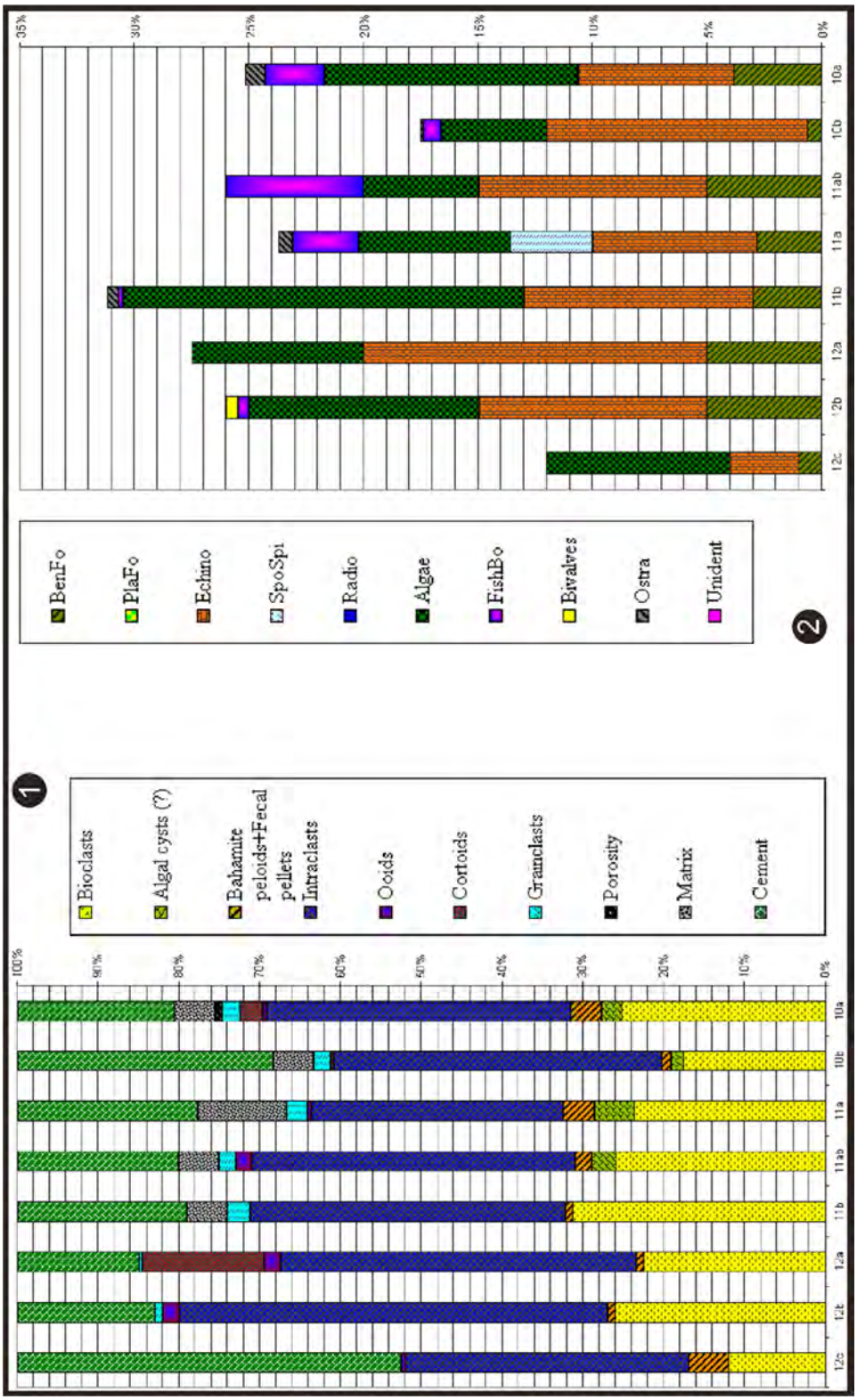
1
Bioclasts
Algal cysts (?)
Bahamite peloids+Fecal pellets
Intraclasts
Ooids
Cortoids
Grainclasts
Porosity
Matrix
Cement
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
2
BenFo
PlaFo
Echino
SpoSpi
Radio
Algae
FishBo
Bivalves
Ostra
Unident
35%
30%
25%
20%
15%
10%
5%
0%
10a
10b
11ab
11a
11b
12a
12b
12c

Fig. 4. **1.** A revised interpretation of the primary constituents of grain-supported chert microfacies from Lower Danube Valley (average values were obtained from estimated primary constituents of thin sections assigned to each microfacies): *intraclasts* - includes the particles identified as silicified mud peloids (composed of microcrystalline quartz) and the intraclasts/lithoclasts (various shapes, from ovoid to irregular, different sizes and different compositions in comparison with the peloids); *mud peloids* are micritic grains resulted from the reworking of lithified carbonate mud and micrite clasts (also called small intraclasts or lithic peloids), and are genetically intraclasts formed by erosion and redeposition within the same basin (E. Flügel 2010, p. 113); mud peloids are found in rock forming amounts in fine-grained peloidal limestones from shallow-marine, low energy, restricted inner platform environments (E. Flügel 2010, p. 117); *intraclasts* are carbonate fragments of lithified or partially lithified sediment derived from the erosion of nearby penecontemporaneous sediment from within the basin and redeposited in the same area; intraclasts are present in shallow-marine environments (supra-, inter- and subtidal settings), dominated by waves and tides, but are also found in deep water settings as transported materials (E. Flügel 2010, p. 166-167); *Bahamite peloids + Fecal pellets* - these dark coloured particles of different sizes and shapes (oval, ovate-oblong, rod-like, round) were simply identified as peloids composed of micrite, but at a closer inspection they turned up to be micritized grains and fecal pellets; *Bahamite peloids* (or micritized grains) are ooids and skeletal grains exhibiting loss of their internal structure through micritization processes, found in shallow-marine environments (E. Flügel 2010, p. 116); *fecal pellets* are fine-grained micrite grains (elongate, rod-shaped or ovoid) derived from carbonate-ingesting organisms that digest organic matter from mud and excrete lime-mud (E. Flügel 2010, p. 112-113); *cortoids* - carbonate grains (bioclasts, ooids, peloids) with a micrite envelope resulted from micritization processes, common in shallow-marine high-energy settings (E. Flügel 2010, p. 114, 118-121); *ooids* - spherical and egg-shaped grains with a nucleus surrounded by an external concentrically laminated cortex (E. Flügel 2010, p. 142-143); the low abundance of ooids suggests transportation out of the settings where they were formed (inner platform, shallow-marine high- and low-energy environments); *algal cysts (?)* - includes spherical and egg-shaped particles with sizes about 100-300 μm, initially identified as peloids composed of chalcedony and megaquartz; these particles present the characteristics of algal cysts (spherical, thin-walled and hollow) found in shallow-marine carbonates (G.F. Elliott 1986, p. 739-740; E. Flügel 2010, p. 452); their hollow part was initially filled by calcite spar, but was later dissolved and silicified, probably via a mould stage; *bioclasts* (or skeletal grains) - represented by subangular to subrounded fragments of fossils, various shapes (round, oval, irregular, rectangular);

2. Fossil types and abundance in chert microfacies from Lower Danube Valley (average values were obtained from estimated bioclast composition of thin sections assigned to each microfacies): low diversity of petrographic fossils; larger echinoderm plates and whole algae have ovoid shapes and rounded morphologies; framboidal pyrite was identified in the centre of some echinoderm plates, indicating reducing conditions and replacement of organic material triggered by bacterially controlled processes (E. Flügel 2010, p. 646-647); most frequent benthic foraminifera in these samples are miliolids (common in shallow near-shore and lagoonal environments), but also coiled, biserial and agglutinated types appear; some of the miliolids are worn and abraded or even broken (sample Giur-Ca [01]), but many of them exhibit signs of micritization, i.e a process whereby the margins of carbonate grains or the total volume of grains are replaced by crypto- or microcrystalline carbonate crystals due to microboring organisms (E. Flügel 2010, p. 118); the abrasion signs on miliolids and rounded morphologies of larger bioclasts suggests transport from the initial living environments; **Legend:** BenFo - benthic foraminifera; PlaFo - planktonic foraminifera; Echino - echinoderms; SpoSpi - sponge spicules; Radio - radiolarians; FishBo - rounded fragments of fish bones; Ostra - ostracods; Unident - unidentified.

1. O interpretare revizuită a constituenţilor primari din microfacies-urile silicolitice de pe Valea Dunării inferioare;
2. Tipuri de fosile şi abundenţa lor în microfacies-urile silicolitice de pe Valea Dunării inferioare.

No.	Particles (%)	Micrite matrix* (%)	Depositional fabric	Sorting	Grain size	Depositional setting	Marine environment
10a	74.7	5.0	packstone	moderate	fine sand	platform margin sand shoals	shallow-water
10b	63.3	5.0	packstone	moderate	fine sand	platform margin sand shoals	shallow-water
11a	66.7	11.0	packstone	moderate	fine sand	platform margin sand shoals	shallow-water
11ab	75.1	5.0	packstone	moderate	medium sand	platform margin sand shoals	shallow-water
11b	74.0	5.0	packstone	moderate	coarse sand	platform margin sand shoals	shallow-water
12a	85.0	0.0	grainstone	moderate	coarse sand	platform margin sand shoals	shallow-water
12b	83.0	0.0	grainstone	moderate	medium sand	platform margin sand shoals	shallow-water
12c	52.5	0.0	packed wackestone /grainstone	good	medium sand	platform margin sand shoals	shallow-water

Matrix – interstitial material mechanically deposited between larger grains (E. Flügel 2010, p. 73); micrite – the fine-grained matrix (1–4 μm) of carbonate rocks and the fine-grained constituent of carbonate grains (E. Flügel 2010, p. 75); packstones – grains supporting each other and a small amount of matrix; grainstones – just grains, no matrix.

* The micrite matrix has the following traits: impregnated with iron oxy-hydroxides in microfacies [10a], [11a], [11ab], suggesting a possible subaerial exposure (I.I. Bucur *et alii* 2014, p. 68); partially silicified in microfacies [11a], [11ab], [11b]; preserved as such in microfacies [10b]. The matrix in microfacies [10a], [10b], [11a], [11ab] partially surrounds the particles and alternates with areas of chalcedony cementation, suggesting deposition in the same time with the grains. The matrix in microfacies [11b] seems to be present in interparticle pores (while all sheltered voids are cemented), which implies that mud probably settled out into empty pores of underlying sediments.

Tab. 3. Depositional fabrics and environments of the intraclastic-bioclastic cherts from the Lower Danube Valley.
Fabric-uri şi medii depoziţionale ale silicolitelor intraclastic-bioclastice de pe Valea Dunării inferioare.

The diagenetic fabric of these cherts (tab. 4) suggests an early diagenetic cementation of the sediment (marine to meteoric environments) and silicification of all the constituents in meteoric environments, prior or simultaneously to lithification (M.J.F. Lawrence 1993, p. 22-23; P.L. Knauth 1994, p. 244-246, 249; E. Flügel 2010, p. 276), having various degrees of intensity: silica precipitation in intra- and intergranular voids (chalcedony and megaquartz) following carbonate dissolution, and silica replacement (microcrystalline quartz, megaquartz and chalcedony) of micrite matrix and grains simultaneous with carbonate dissolution.

The association of intraclasts, cortoids, micritized grains and ooids, rounded worn and abraded bioclasts (E. Flügel 2010, p. 116-117, 121, 142-143, 167), and absence of planktonic fossils, indicates sedimentation in a shallow-marine platform-margin

environment (tab. 3), in contradiction with my previous positions (Al. Ciornei 2013, pl. 1; Al. Ciornei *et alii* 2014, p. 146-148), but in accordance with the depositional setting of some intraclastic-bioclastic grainstones and packstones from shallow-marine carbonates (tab. 5).

No.	Ground mass (%)	Cement (%)	InterPartCem (%)		Replacement (%)		SyntCem (%)		Diagenetic fabric*
10a	24.3	19.3	Qf-By	19.3	-	0.0	-	0.0	silicified packstone
10b	36.7	31.7	Qf-By	31.4	-	0.0	Cal	0.3	silicified packstone
11a	33.3	22.3	Qf-By	6.0	Qm-Gr	16.2	Cal	0.1	silicified packstone
11ab	24.9	19.9	Qf-By	10.0	Qm-Gr	9.9	-	0.0	silicified packstone
11b	26.0	21.0	Qf-By	5.0	Qm-Gr	16.0	-	0.0	silicified packstone
12a	15.0	15.0	Qf-By/+MQ	14.0	-	0.0	Cal	1.0	partially silicified grainstone
12b	17.0	17.0	Qf-By/+MQ	17.0	-	0.0	-	0.0	silicified grainstone
12c	47.5	47.5	Qf-By/+MQ	47.5	-	0.0	-	0.0	entirely silicified packed wackestone/ grainstone

Groundmass – the combined amount of matrix and cement; InterPartCem – interparticle cement; Qf-By – interparticle botryoidal chalcedony cement consisting of individual and compound fans of elongated fibres with sweeping extinction in cross-polarized light, filling the space previously occupied by a carbonate cement (R.L. Folk, C.E. Weaver 1952, p. 506, 507; R.L. Folk, J.S. Pittmann 1971, p. 1050; C. Frondel 1978, p. 24-25; M.J.F. Lawrence 1993, p. 19; P.L. Knauth 1994, p. 234-235; B. Rogala *et alii* 2010, p. 1782), sometimes associated with drusy megaquartz cement in the centre of these fillings; MQ – drusy megaquartz cement representing void-filling cement in intergranular pores and (equant to elongated, anhedral to subhedral crystals, larger than 20 μm); Qm-Gr – granular microcrystalline quartz cement (equidimensional small crystals) resulted from replacement of the matrix (R.L. Folk, C.E. Weaver 1952, p. 506; M.J.F. Lawrence 1993, p. 19); SyntCem – syntaxial calcite (Cal) overgrowth cement on echinoderm plates, some times replaced by silica, generally considered to be formed in near-surface marine, vadose-marine, meteoric-phreatic, and deep burial diagenetic environments (E. Flügel 2010, p. 295, 298).

* Dissolution of carbonate is fabric selective and ranges from: *patchy fabric-destructive* as moulds of algal cysts (?) and bioclasts filled up with Qf and MQ, indicating a dissolution stage in a meteoric-phreatic environment (E. Flügel 2010, p. 275); *incomplete dissolution fabrics* observed as carbonate inclusions in MQ replacing the calcite in bioclasts (especially echinoderm plates), and implying that silicification took place at the same time as the carbonate dissolution; *fabric-retentive* as shown by Qm and Qf replacement of bioclasts (retaining the ghost structures of algae, echinoderm plates and non-skeletal grains), also supporting a simultaneous dissolution of carbonate.

Tab. 4. Diagenetic features of the intraclastic-bioclastic cherts from the Lower Danube Valley. Caracteristicile diagenetice ale silicolitelor intraclastic-bioclastice de pe Valea Dunării inferioare.

Context	Age	Microfacies	Characteristics	Depositional setting	Reference
Pădurea Craiului Mts, Apuseni Mts (Bihor-Pădurea Craiului unit, Vârciorog Formation, Romania)	Upper Aptian-Albian	intraclastic-bioclastic grainstone and packstone	well-sorted clasts (grainstone) and poorly-sorted clasts with angular to subrounded shapes (packstones); bioclasts are echinids, bryozoans, gastropods, miliolids, orbitolinids, large agglutinated foraminifera, rudists fragments, green algae and rivulariacean-type cyanobacteria; syntaxial growth on echinid fragments	shelf slope, generated by turbiditic flows	I.I. Bucur *et alii* 2010a, p. 178
Perşani Mts (Urgonian limestones, Perşani Nappe, Romania)	Barremian-Aptian	intraclastic-bioclastic grainstone/ rudstone	high degree of sorting, subangular to subrounded, 30-40% intraclasts, 25% peloids and cortoids, 25% skeletal fragments of bivalves, gastropods, dasycladalean algae, echinoids, ostracods, and miliolids, 5% terrigenous quartz clasts, sparitic cement	open-platform margin shoals, agitated subtidal, above the fair-weather base	Al.V. Marian, I.I. Bucur 2012, p. 11, 19
Codlea area (Štramberk-type limestones, Southern Carpathians, the Getic Carbonate Platform, Romania)	Berriasian-lower Valanginian	peloidal-bioclastic, intraclastic grainstone/ rudstone	larger agglutinated foraminifera, micritization rims; cement types: early marine fibrous-acicular, non-ferroan scalenohedral calcite, drusy ferroan calcite, syntaxial calcite overgrowths on echinoderm fragments; ferruginized matrix (reddish-brown color due to variable iron oxy-hydroxide content)	shallow-marine, subaerial exposure	I.I. Bucur *et alii* 2014, p. 67-69
Piatra Craiului Massif (white limestones, Southern Carpathians, the Getic carbonate platform, Romania)	Kimmeridgian -Lower Valanginian	bioclastic-intraclastic grainstone with black pebbles	dasycladalean algae (with micritic rim around them), rivulariacean-type cyanobacteria, gastropods, coral fragments, sponges, intraclasts and black pebbles	internal platform margin, high energy subtidal environment	C. Mircescu *et alii* 2013, p. 7-8
Hulei-Mateiaş area (Mateiaş Limestone, Southern Carpathians, the Getic carbonate platform)	Oxfordian-Tithonian	bioclastic-intraclastic rudstone	corals and/or microbialite fragments (coarse fraction), intraclasts of allodapic grainstone, packstone, and calcareous breccias; the matrix is medium to fine-grained grainstone	shelf margin and the upper part of the platform slope	I.I. Bucur *et alii* 2010a, p. 10, 27-28; 2010b, p. 35, 37
60 km north of Danube, between Vedea and Ialomiţa (Moesian Platform, Eastern Carbonate shelf, Romania)	Late Berriasian	oolitic grainstone and wackestone	ooids, dasycladalean algae, foraminifera	shoal of the middle shelf carbonate ramp	O.N. Dragastan *et alii* 2005, p. 145-148
	Late Valanginian	oolitic grainstone	ooids, reworked mudstone intraclasts, *Favreina njegosensis* and *Favreina dinarica*, rarely dasycladalean algae		
Lovech-Veliko Tarnovo area (Urgonian limestones, Central Fore-Balkan shelf, Bulgaria)	Barremian	bioclastic-intraclastic grainstones	bioclasts (bryozoans, algae), intraclasts, oolits, and rare benthic foraminifera	slope and toe-of-slope (external-distal shelf boundary)	V. Minkovska *et alii* 2004, p. 934-936

Tab. 5. Different types of intraclastic-bioclastic limestones from shallow and deep marine environment.
Diferite tipuri de calcare intraclastic-bioclastice din medii marine de apă puţin adâncă şi adâncă.

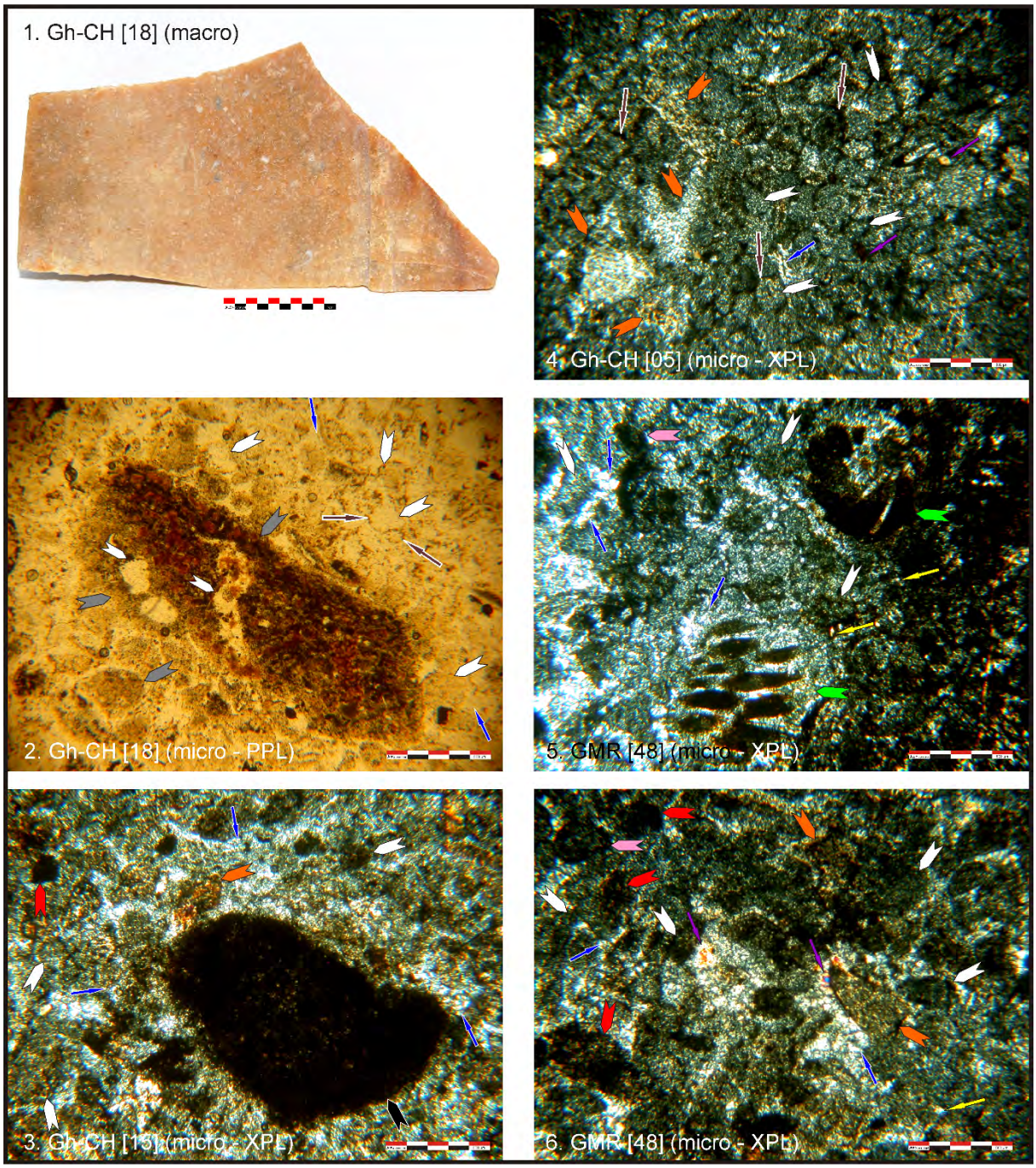

Fig. 5. Microfacies [10a]: rusty-brown colour, dull, translucent, with sporadic beige-whitish irregular and millimetre sized carbonate reminiscences; moderately sorted packstone; the space between particles is filled up by remnant micrite matrix (brown arrows), in some samples ferruginized, and botryoidal chalcedony cement (blue arrows); predominant particles are silicified intraclast (white arrows), Bahamite peloids (pink arrows), fecal pellets (red arrows), algae and echinoderm bioclasts (orange arrows), sporadic rounded fish fragments (purple arrows), quartz grainclasts (yellow arrows), Miliolid, biseriate and coiled benthic foraminifera (green arrows); other distinct and characteristic particles are large intraclasts composed either of micrite, bioclasts and quartz grainclasts (grey arrows), or micrite, quartz and clay grainclasts (black arrow); macro photo - scale is 1 cm; micro photos - scales are 500 μm; XPL - cross-polarized light; PPL - plane-polarized light; photos by Al. Ciornei (2012-2013).
Caracteristicile principale ale microfacies-ului [10a].

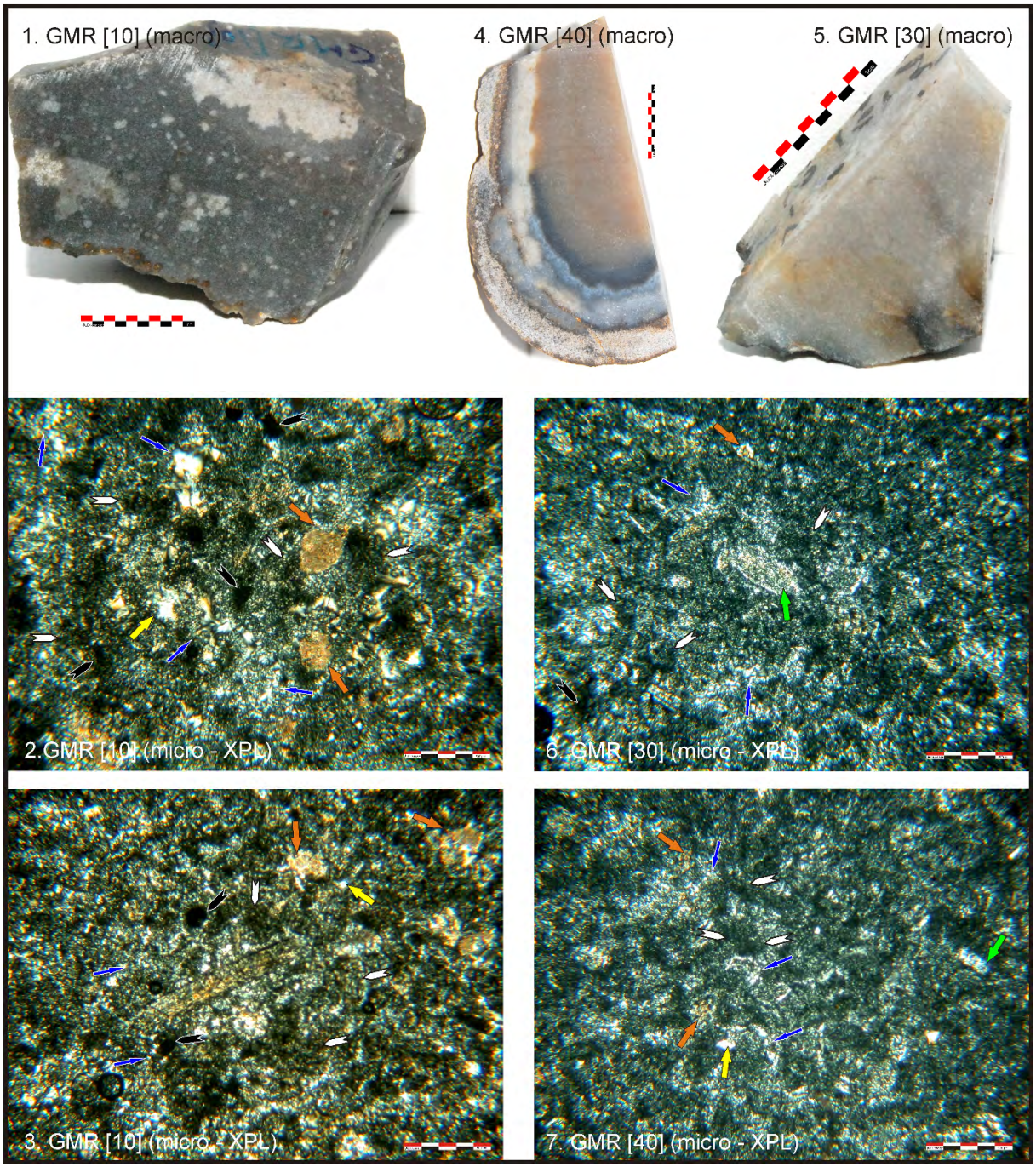

Fig. 6. Microfacies [10b]: colour from grey to rosy, dull, translucent; moderately sorted packstone; groundmass composed of remnant micrite matrix and intergranular botryoidal chalcedony cement (blue arrows); predominant particles are silicified intraclasts (white arrows); subordinate particles are fine-grained phosphatized (orange arrows) or silicified (green arrows) echinoderm bioclasts, sporadic algae fragments, quartz grainclasts (yellow arrows), fecal pellets (black arrows), and benthic foraminifera; some echinoderm plates exhibit a remnant overgrowth cement (calcite syntaxial cement) partially replaced by drusy megaquartz cement; macro photos - scale are 1 cm; micro photos - scales are 500 μm; XPL - cross-polarized light; photos by Al. Ciornei (2012-2013).
Caracteristicile principale ale microfacies-ului [10b].

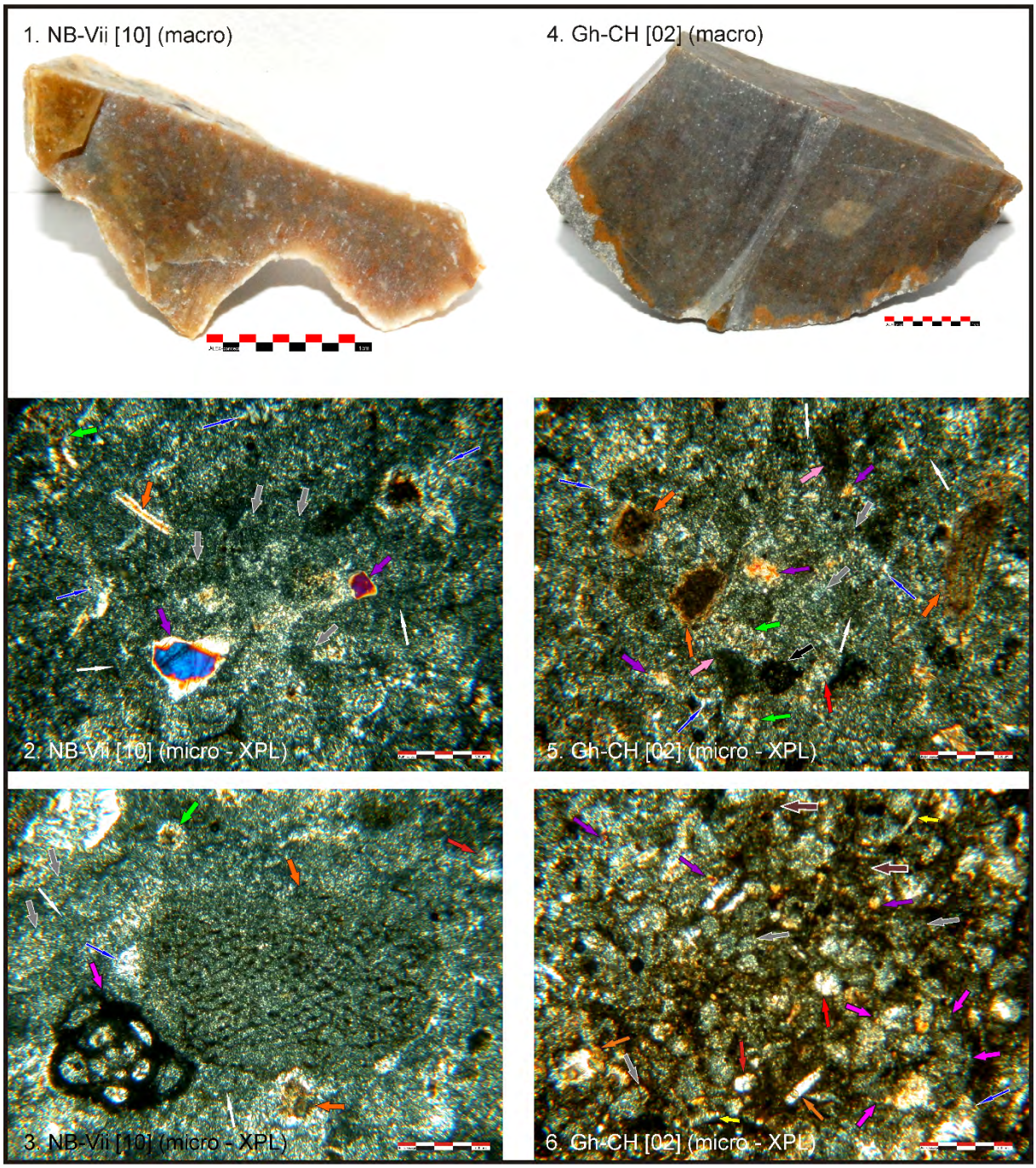

Fig. 7. 1-3. Microfacies [11ab]: clear brown, dull, translucent; moderately sorted packstone; composed of intraclasts (grey arrows), algal cysts (red arrows), fragments of echinoderms (orange arrows), algae (green arrows), and fish bones (purple arrows), miliolids (magenta arrow) and biseriate benthic foraminifera, enclosed in a micrite matrix replaced by cryptocrystalline quartz (white arrows), and a chalcedony cement (blue arrows); **4-6.** Microfacies [11a]: greyish-black, dull, translucent; moderately sorted packstone; composed of a micrite matrix, ferruginized (brown arrows) and mostly replaced by a granular quartz cement (white arrows), with pore filling chalcedony cement (blue arrows); constituent grains are intraclasts (grey arrows), fecal pellets (pink arrows), Bahamite peloids (black arrow), fragments of echinoderms (orange arrows), algae (green arrows), fish bones (purple arrows), sponge spicules (yellow arrows), miliolid, biseriate and coiled (magenta arrows) benthic foraminifera, and algal cysts (red arrows); macro photos - scales are 1 cm; micro photos - scales are 500 μm; XPL - cross-polarized light; photos by Al. Ciornei (2012).
Caracteristicile principale ale microfacies-urilor [11ab] (**1-3**) şi [11a] (**4-6**).

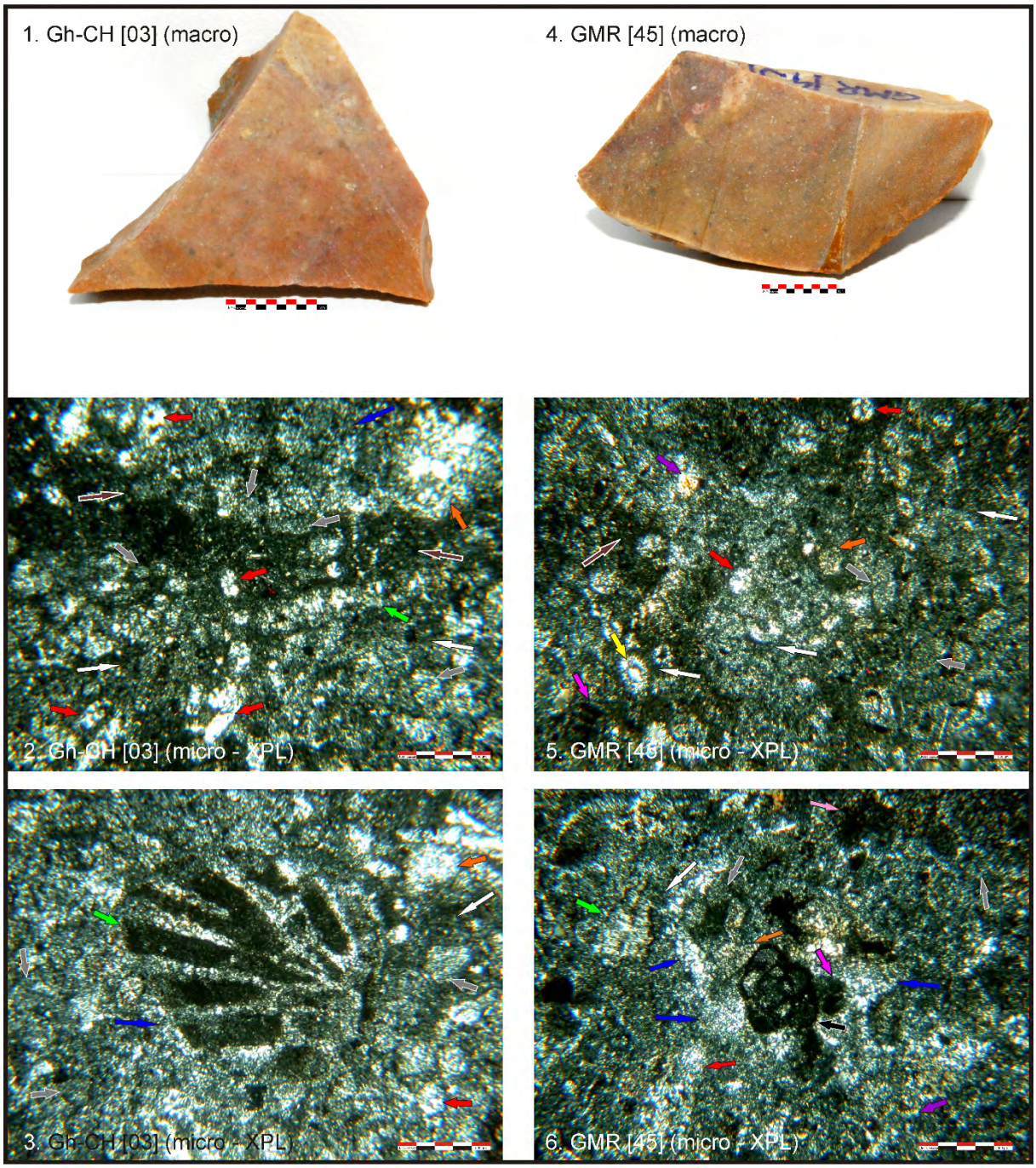

Fig. 8. Microfacies [11a]: greyish-rosy colour, dull, translucent; packstone; groundmass is composed of a micrite matrix (brown arrows), partially replaced by a granular cryptocrystalline quartz cement (white arrows), and botryoidal chalcedonic cement (blue arrows); predominant grains are oval, rod-shaped or round intraclasts, most of them silicified (grey arrows); subordinated composing particles are echinoderm (orange arrows) and algae bioclasts (green arrows), Bahamite peloids (pink arrow), fecal pellets, Miliolid (black arrow), biseriate (magenta arrows) and coiled benthic foraminifera, rounded fragments of fish bones (purple arrows), ooids (yellow arrows), and quartz grainclasts; in comparison with other samples from this microfacies and other microfacies, these samples contain the highest amount of egg-shaped and round particles (algal cysts?) filled up by chalcedony or megaquartz (red arrows); macro photos - scales are 1 cm; micro photos - scales are 500 μm; XPL - cross-polarized light; photos by Al. Ciornei (2012).

Caracteristicile principale ale microfacies-ului [11a].

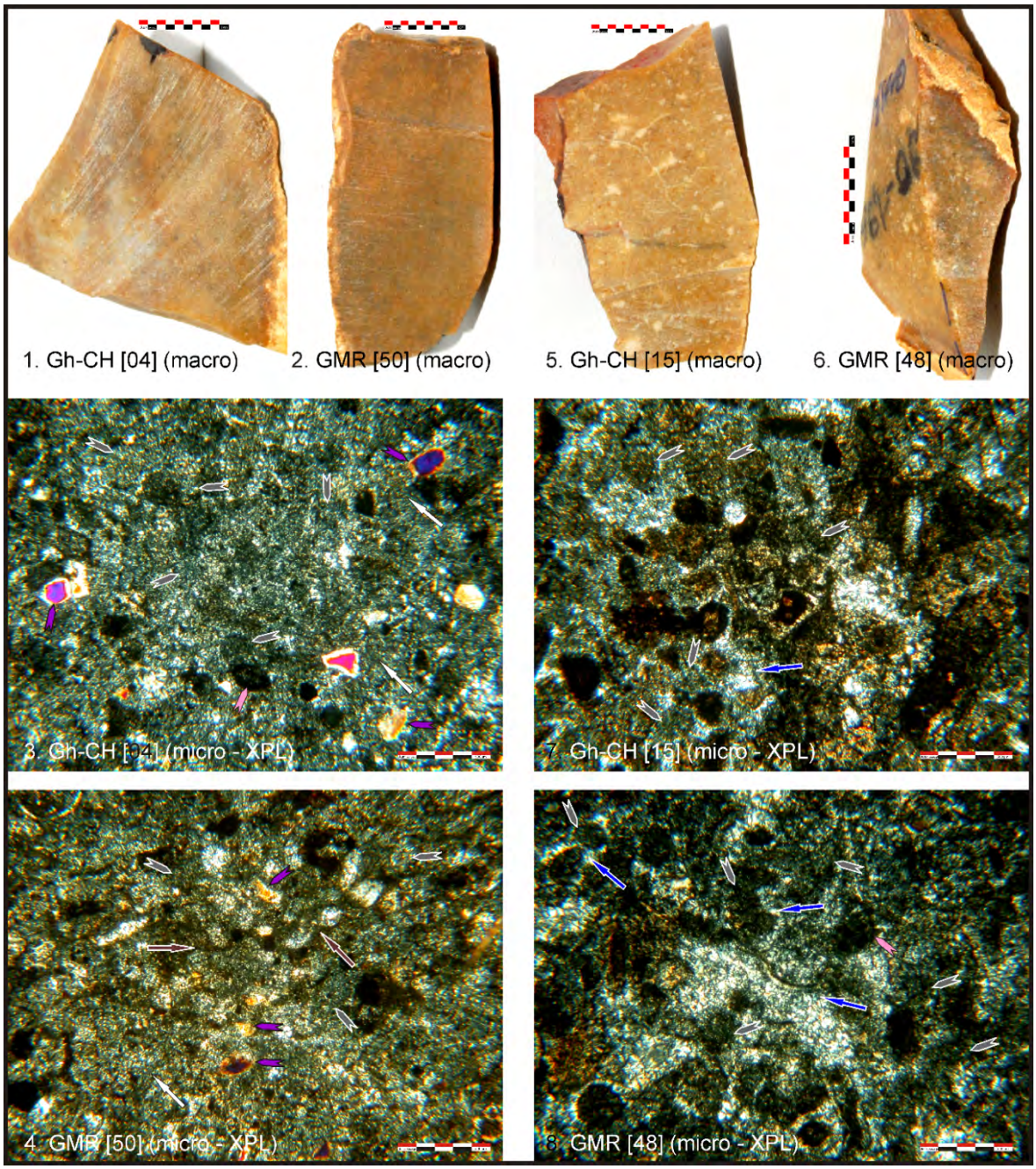

Fig. 9. Visually similar rusty-brownish cherts from Giurgiu-Malu Roşu site (2, 4, 6, 8) and Ghizdaru-Haltă Quarry sampling location (1, 3, 5, 7): **1-4.** Microfacies [11a] having as distinguishing traits abundant intraclasts (grey arrows), bioclasts, and larger fragments of fish bones (purple arrows) enclosed in a matrix, partially ferruginized (brown arrows) and partially replaced by granular cryptocrystalline quartz cement (white arrows); **5-8.** Microfacies [10a] with abundant intraclasts (grey arrows) and bioclasts enclosed in a groundmass of micrite matrix and botryoidal chalcedony cement (blue arrows); most of the blackish grains in both microfacies are fecal pellets, but some of them are Bahamite peloids (pink arrows); despite the obvious illustrated distinctive traits, these samples were very difficult to differentiate through direct comparison of thin sections before using microfacies criteria, and only after centralizing data on spread sheets they could be separated as distinct microfacies; macroscopically they are very similar and minor differences are visible in slices remained from preparation of thin sections; macro photos - scales are 1 cm; micro photos - scales are 500 μm; XPL - cross-polarized light; photos by Al. Ciornei (2012).
Silicolite similare macroscopic de la Malu Roşu (2, 4, 6, 8) şi Ghizdaru (1, 3, 5, 7).

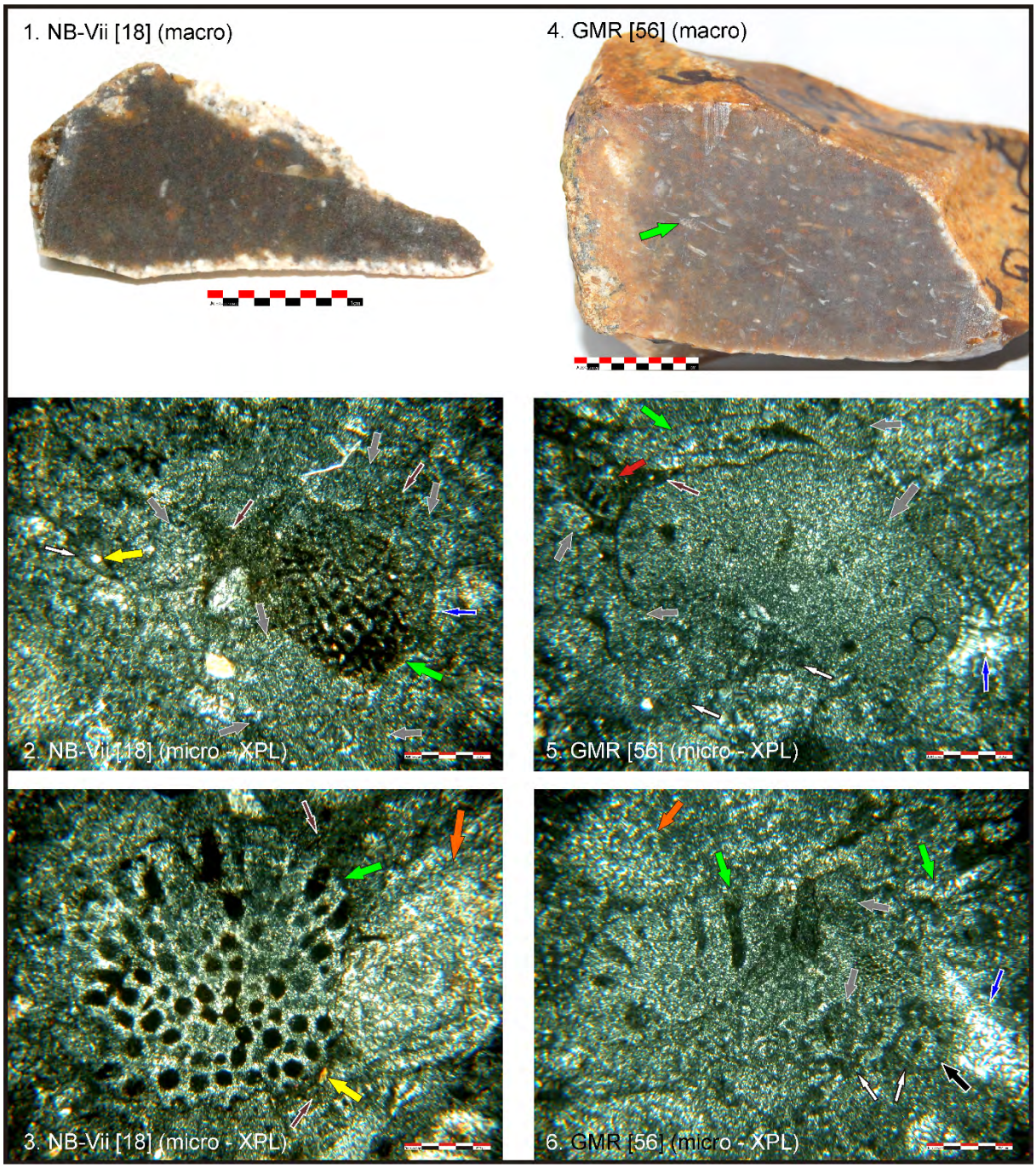

Fig. 10. Microfacies [11b]: reddish brown and greyish black, greasy lustre, very translucent; moderately sorted packstone; intergranular pores are filled up by a micrite matrix (brown arrows), partially replaced by granular cryptocrystalline quartz cement (white arrows); botryoidal chalcedony cement (blue arrow) is found only in the sheltered pore spaces; predominant particles are intraclasts (grey arrows), rounded algae fragments (green arrows), echinoderm plates (orange arrows), sand-sized quartz grainclast (yellow arrows), ooids (black arrow), and benthic foraminifera (red arrow); algae fragments are very different between these two samples and suggests either a different location inside the above mentioned depositional setting, or a different geological stage or period; also, algae fragments have similar morphologies (i.e. subrounded to rounded large bioclasts) with those from microfacies [12a]; macro photos - scale are 1 cm; micro photos - scales are 500 μm; XPL - cross-polarized light; photos by Al. Ciornei (2012-2013).
Caracteristicile principale ale microfacies-ului [11b].

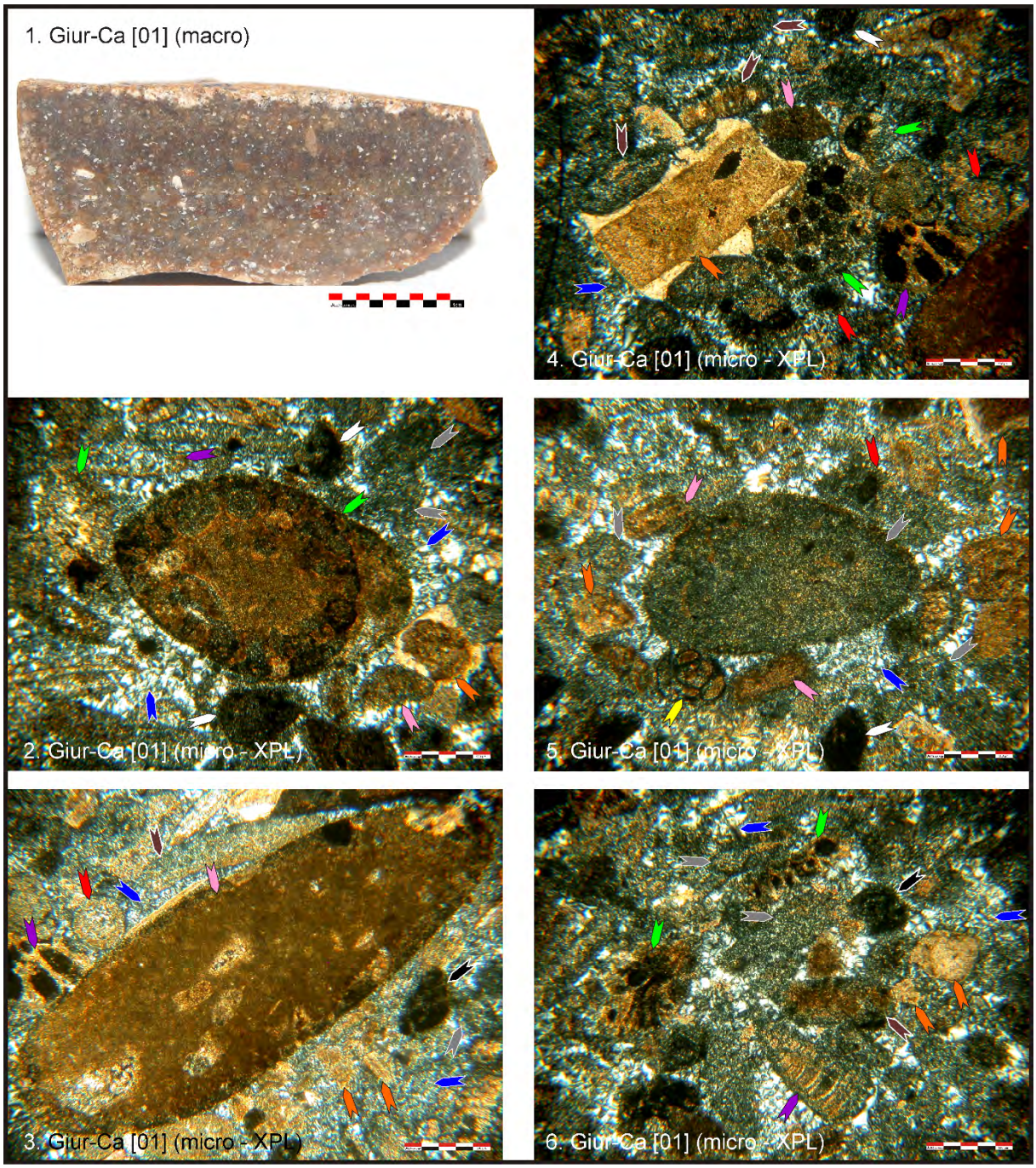

Fig. 11. Microfacies [12a]: dark brown, dull, translucent; well sorted grainstone; predominant particles are silicified (grey arrows) and phosphatized (pink arrows) intraclasts, fecal pellets (white arrows), Bahamite peloids (black arrows), cortoids (brown arrows), rounded fragments of algae (green arrows), echinoderm plates with overgrowth syntaxial cement (orange arrows), benthic biseriate (purple arrows) and Miliolid (yellow arrow) foraminifera, ooids (red arrows); the association of very rounded bioclasts, intraclasts, and abundant cortoids refer to a constant agitated shallow-water marine environment at or above wave base line (E. Flügel 2010, p. 121); pore space is filled by botryoidal chalcedony cement (blue arrows); macro photo - scale is 1 cm; micro photos - scales are 500 μm; XPL - cross-polarized light; photos by Al. Ciornei (2013).
Caracteristicile principale ale microfacies-ului [12a].

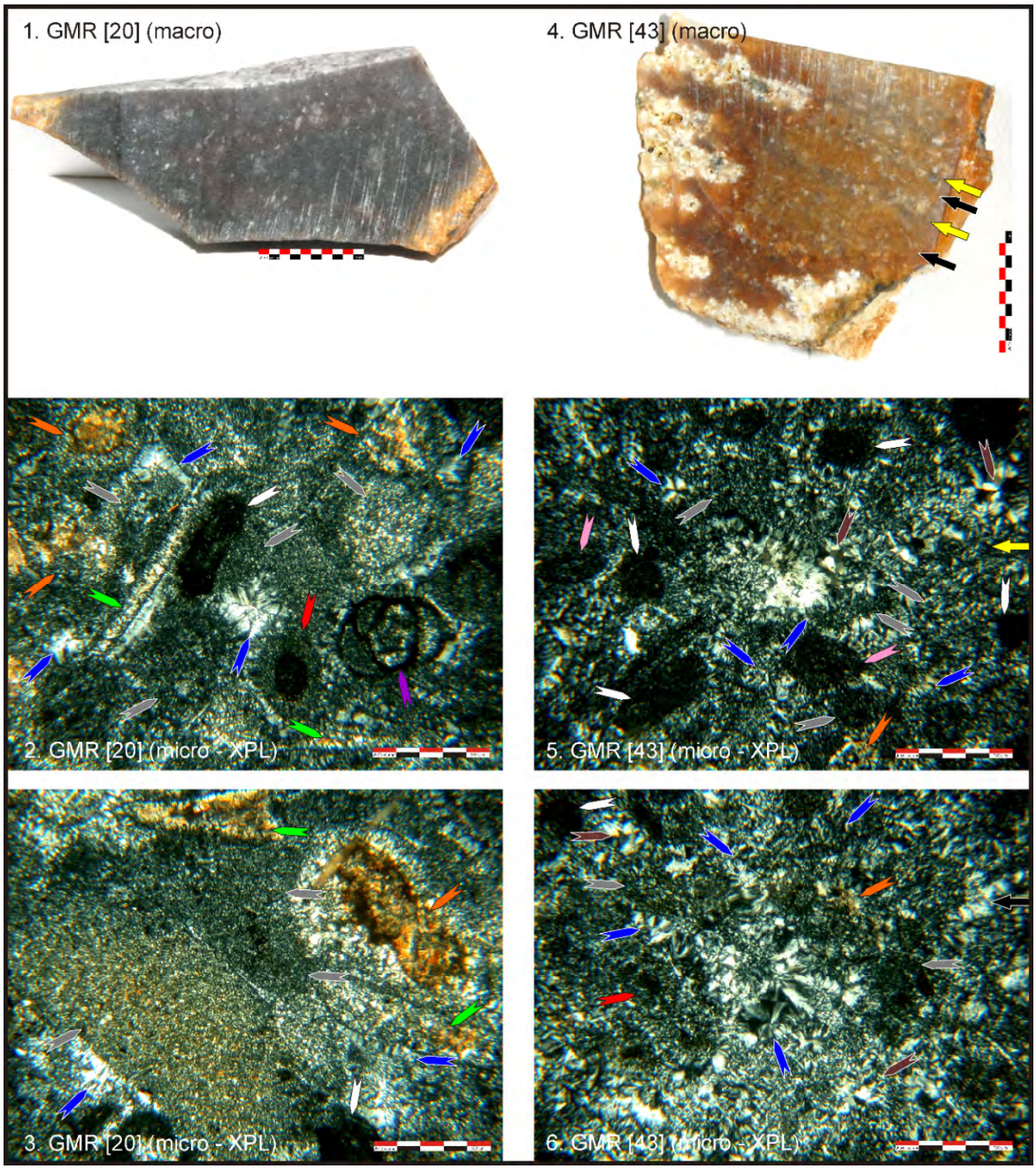

Fig. 12. 1-3. Microfacies [12b]: bluish-grey colour, greasy lustre, translucent; moderately sorted grainstone; pore space filled with botryoidal chalcedony and drusy megaquartz cement (blue arrows); predominant particles are silicified intraclasts (grey arrows), fecal pellets (white arrows), fragments of algae (green arrows) and echinoderm plates with syntaxial overgrowth cement (orange arrows), Miliolid foraminifera (purple arrow), and ooids (red arrow); **4-6.** Microfacies [12c]: rusty brownish, greasy lustre, very translucent; composed of alternating centimetre-sized brownish laminae (black arrows; grainstone fabric) and millimetre-sized clear grey laminae (yellow arrows; packed wackestone fabric); predominantly composed of silicified intraclasts (grey arrows), fecall pellets (white arrows), Bahamite peloids (pink arrows), bioclasts (orange arrows), some still recognizable ooids (red arrow); pore space is filled with botryoidal chalcedony cement (blue arrows), while the drusy megaquartz cement (brown arrows) might be related to voids infilling; the packed wackestone fabric (6) has a lower content of grains and a higher amount of cement; macro photos - scale are 1 cm; micro photos - scales are 500 μm; XPL - cross-polarized light; photos by Al. Ciornei (2012).
Caracteristicile principale ale microfacies-urilor [12b] (**1-3**) şi [12c] (**4-6**).

4. 2. Geological occurrence of intraclastic-bioclastic cherts in the study area

In the current state of research, the intraclastic-bioclastic cherts have a very restricted geographical distribution, more specifically the Giurgiu-Călăraşi area (fig. 13/1), and are found in secondary geological contexts: in the gravel deposits of Frăteşti Formation (Lower Pleistocene), together with Upper Cretaceous (K_2) nodular cherts, confirmed in locations situated north of Giurgiu city, such as Ghizdaru-Haltă Quarry and Cetatea-Bălănoaia Quarry (but this formation is also opened in other places such as the abandoned quarries from Frăteşti and Daia); in Danube's lower terrace (t_1) deposits (Upper Pleistocene), together with K_2 nodular cherts, confirmed at Giurgiu-South Western Quarry (also opened at Giurgiu-Malu Roşu Quarry).

The Giurgiu-Călăraşi area overlays a restricted part of the structural-tectonic unit called the Walachian Sector of the Moesian Platform, extending between the Subcarpathian Nappe to the north, the Southern Carpathians to the west, the Danube to the south and the South-Dobrogean Platform to the east (P. Enciu 2007, p. 29; V. Mutihac *et alii* 2007, p. 41, 45). The crystalline basement sustains a sedimentary cover accumulated during four sedimentary cycles (D. Paraschiv 1983, p. 177; R. Muţiu 1997, p. 88-93; V. Mutihac *et alii* 2007, p. 42): Middle Cambrian-Carboniferous, Permian-Triassic, Jurassic-Cretaceous and Neogene-Quaternary (the only outcropping deposits).

The Frăteşti Fm is a lithostratigraphic unit composed of 3 to 4 cross-stratified fining-upward sequences (gravels and silty-clays, gravels and silty-sands, gravels and sands), deposited as stacked proximal to distal alluvial fans in the Walachian sector of the Moesian Platform (I. Andreescu *et alii* 2011, p. 203-205; 2013, p. 21-22). In the study area (fig. 13/1), Frăteşti Fm outcrops on the southern (1-3 m thick) and northern sides of the Burnas Plain (10-15 m thick), but also in all deeper valleys fragmenting this plain, while further east of Mostiştea valley, it is buried under the clayey-silty sequences of Coconi Fm (Middle Pleistocene) (T. Bandrabur 1966, p. 17-18; T. Bandrabur *et alii* 1966, p. 15; T. Bandrabur, D. Patrulius 1967, p. 17; P.V. Coteţ 1976, p. 54-56). North of Bucharest, Frăteşti Fm passes laterally to the fine siliciclastic sediments (clays, silts, sands) of Copăceni Beds (Lower Pleistocene) (I. Andreescu *et alii* 2011, p. 207; 2013, p. 24). Despite the debates on the age and the way these stacked alluvial fans were formed, the presence of "Prebalkan/Balkan elements" / "Prebalkan Platform elements" was admitted within the Frăteşti Fm gravels since the works of G. Murgoci and I. Popescu-Voiteşti in the first half of the XX-th century (P.V. Coteţ 1976, p. 70; M. Feru *et alii* 1979, p. 154). This clastic material indicates a Balkan-Moesian source area and deposition by rivers flowing from northern Bulgaria (P.V. Coteţ 1976, p. 32; N. Macarovici 1968, p. 216; P. Enciu 2007, p. 150; I. Andreescu *et alii* 2011, p. 215). At Ghizdaru-Haltă Quarry, the exposed cross-section of this formation shows tabular cross-bedded gravel layers (0.60 m thick) fining upward into planar bedded sand layers with thin gravel interbeds (Al. Ciornei 2013, pl. 34, 35). The orientation of the cross-stratification suggests a possible SW-NE direction of the paleocurrent (but measurements for current directions were not taken during the field surveys), in accordance with the transport directions for alluvial sediments of Frăteşti Fm (fig. 13/1; I. Andreescu *et alii* 2013, fig. 1).

Danube's lower terrace (t_1) expands from Zimnicea to Vedea confluence, reappearing as a narrow strip from Pietroşani and continuing to widen from E-NE of Găujani up to Giurgiu, disappearing east of the city. East of Argeş, this terrace reappears from Spanţov to Mostiştea, and from Dorobanţu to East of Călăraşi (T. Bandrabur 1966, p. 10, 20-21; T. Bandrabur *et alii* 1966, 8-9, 17; T. Bandrabur, D. Patrulius 1967, p. 8, 19).

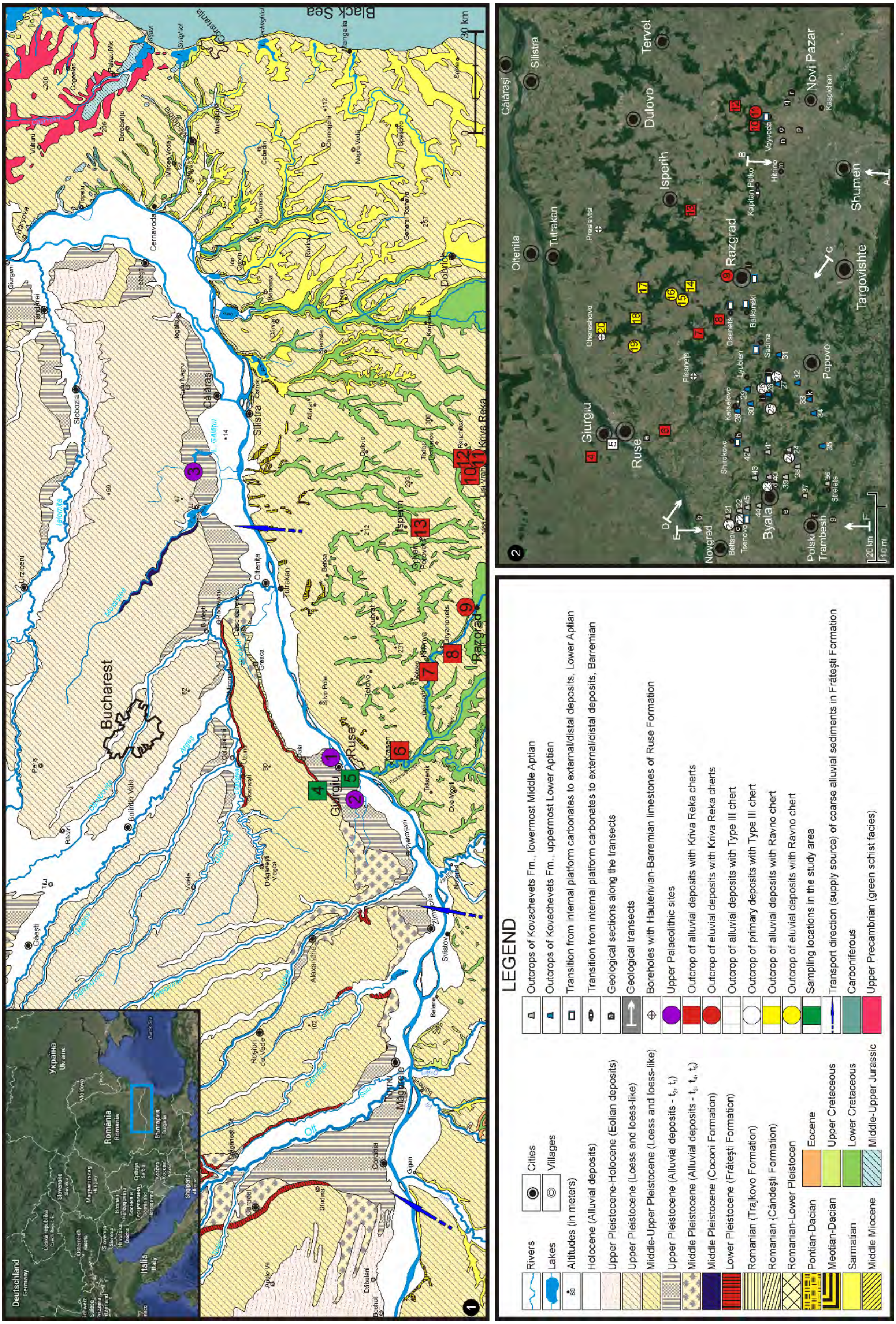
1
2
Bucharest
Black Sea
Giurgiu
Ruse
Razgrad
Isperih
Kriva Reka
Oltenița
Tutrakan
Silistra
Dulovo
Tervel
Novi Pazar
Shumen
Targovishte
Popovo
Byala
Novgrad
Polski Trambesh
30 km
Rivers
Lakes
Altitudes (in meters)
Holocene (Alluvial deposits)
Upper Pleistocene-Holocene (Eolian deposits)
Upper Pleistocene (Loess and loess-like)
Middle-Upper Pleistocene (Loess and loess-like)
Upper Pleistocene (Alluvial deposits - t2, t1)
Middle Pleistocene (Alluvial deposits - t5, t4, t3)
Middle Pleistocene (Coconi Formation)
Lower Pleistocene (Frătești Formation)
Romanian (Trajkovo Formation)
Romanian (Cândești Formation)
Romanian-Lower Pleistocen
Pontian-Dacian
Meotian-Dacian
Sarmatian
Middle Miocene
Cities
Villages
Eocene
Upper Cretaceous
Lower Cretaceous
Middle-Upper Jurassic
LEGEND
Outcrops of Kovachevets Fm., lowermost Middle Aptian
Outcrops of Kovachevets Fm., uppermost Lower Aptian
Transition from internal platform carbonates to external/distal deposits, Lower Aptian
Transition from internal platform carbonates to external/distal deposits, Barremian
Geological sections along the transects
Geological transects
Boreholes with Hauterivian-Barremian limestones of Ruse Formation
Upper Palaeolithic sites
Outcrop of alluvial deposits with Kriva Reka cherts
Outcrop of eluvial deposits with Kriva Reka cherts
Outcrop of alluvial deposits with Type III chert
Outcrop of primary deposits with Type III chert
Outcrop of alluvial deposits with Ravno chert
Outcrop of eluvial deposits with Ravno chert
Sampling locations in the study area
Transport direction (supply source) of coarse alluvial sediments in Frătești Formation
Carboniferous
Upper Precambrian (green schist facies)

Fig. 13. 1. Distribution of intraclastic-bioclastic cherts (Giurgiu-Călăraşi area) and Kriva Reka type of Ludogorie chert (north-eastern Bulgaria); map support was redrawn after a part of the Geological Map of Romania 1: 1000000 (M. Săndulescu *et alii* 1978), and modified with regard to Pliocene and Pleistocene formations (after I. Andreescu *et alii* 2011; 2013);
2. Geological context of Ludogorie cherts; map support from https://maps.google.ro.
Note: mapping of the Ludogorie chert outcrops locations (on both maps) has been done after I.K. Nachev, Ch. Nachev (1989, p. 84), Ch. Nachev (2007, p. 258), L. Manolakakis (2008, p. 114; 2011, p. 228-230), M. Gurova, Ch. Nachev (2008, p. 33-34), C. Bonsall *et alii* (2010, p. 11-12), B. Mateva (2011, p. 173), P. Andreeva *et alii* (2014, p. 38-42); the position of the Kovachevets Fm outcrops were mapped after T. Nikolov (1987); information regarding the transition from internal platform carbonates to external/distal deposits was mapped after T. Nikolov (1987), M. Ivanov, K. Stoykova (1998), M. Ivanov *et alii* (1997), B. Peybernes *et alii* (1998), V. Minkovska *et alii* (2002a); information on the geological transects and geological sections along the transects was mapped after M. Ivanov *et alii* (1997) and B. Peybernes *et alii* (1998); the boreholes with Hauterivian-Barremian limestones of Ruse Formation were plotted after T. Nikolov (1987); transport direction (supply source) of coarse alluvial sediments in Frăteşti Fm were drawn after I. Andreescu *et alii* (2011, 2013). Locations (on both maps): 1. Giurgiu-Malu Roşu; 2. Slobozia-Râpa Bulgarilor; 3. Nicolae Bălcescu-La Vii; 4. Ghizdaru-Haltă Quarry; 5. Giurgiu-South Western Quarry; 6. Krasen; 7. Krivnya and Senovo; 8. Ginista and Dryanovets (Razgrad district); 9. Chukata (north of Razgrad); 10. Lisi Vrah; 11. Kriva Reka; 12. Ruzhitsa; 13. Golyam Porovets; 14. Topchii; 15. Ravno; 16. Kamenovo; 17. Kubrat; 18. Belovets; 19. Tetovo; 20. Chereshovo; 21. Beltsov; 22. Tsenovo; 23. Byala; 24. Koprivets; 25. Golyamo Gradishte; 26. Krepcha; 27. Opaka; 28. Katselovo; 29. Garchinovo; 30. Gorsko Ablanovo; 31. Zaraevo; 32. Palmaratsa; 33. Kovachevets; 34. Voditsa; 35. Kamen; 36. Strelets; 37. Orlovets; 38. Dryanovets; 39. Bistrentsi; 40. Pet Kladentsi; 41. Baniska; 42. Chilnov; 43. Borovo; 44. Starmen; 45. Dolna Studena; a) Basarabovo; b) Batin; c) Beltsov and Tsenovo, d) Byala; e) Polsko Kosovo; f) Polski Trambesh; g) Sashevo (Petko Karavelovo); h) Ostritsa; i) Krepcha; j) Opaka; k) Kovachevets; l) Razgrad; m) Hitrino; n) Velino; o) Praventsi (north of Varbyane); p) Zlatna Niva; q) Stoyan Mihaylovski; r) Pamukchii.
1. Distribuţia silicolitelor intraclastic bioclastice şi Kriva Reka;
2. Contextul geologic al silicolitelor Ludogorie.

The alluvial deposits of this terrace are composed of gravels and sands (4-10 m/7-12 m/5-8 m thick). At Giurgiu-Malu Roşu Quarry, the lower terrace (t_1) is composed of a cross-laminated sand deposit with interbeds of planar bedded gravels, toped up by a planar bedded clayey/silty sand deposit (Al. Ciornei 2013, pl. 38). At Giurgiu-South Western Quarry, this terrace is composed of a planar bedded gravel layer (over 0.5 m thick, but the full thickness was not observable in the quarry) and planar laminated and cross-laminated sand layers (5-7 m thick) (Al. Ciornei 2013, pl. 37). Chert clasts from this location have a consistent small size (from 3-4 to 10 cm long), subangular contours (flake-like appearance with abraded "fresh cortex" and polished surfaces) or subrounded contours (with abraded "fresh cortex" and/or neocortex), indicating that these materials were reworked from older near-by alluvial deposits.

In north-eastern Bulgaria (the Eastern part of the Danubian Hilly Plain) there are extensive outcrops of Lower Cretaceous (K_1) limestones with cherts in primary and secondary positions (Ruse Fm, Hauterivian-Lower Aptian, and Kovachevets Fm, uppermost Lower Aptian-lowermost Middle Aptian) and Quaternary alluvial deposits with chert pebbles (T. Nikolov 1987, p. 75-80; I.K. Nachev, Ch. Nachev 1989, p. 84-85; M. Ivanov *et alii* 1997, p. 971; B. Peybernes *et alii* 1998, p. 561-562; V. Minkovska *et alii* 2002a, p. 187-191; M. Ivanov, V. Idakieva 2013, p. 50-51). The K_1 cherts were described by I.K. Nachev, Ch. Nachev

(1989, p. 84), Ch. Nachev (2007, p. 258, and references therein), M. Gurova (2008, p. 121), M. Gurova, Ch. Nachev (2008, p. 33-34, and references therein), L. Manolakakis (2008, p. 114), C. Bonsall *et alii* (2010, p. 11-12), B. Mateva (2011, p. 173), L. Manolakakis (2011, p. 228-230), P. Andreeva *et alii* (2014, p. 38-42), and they go by the name of Ludogorie (Luda Gora, Ludogorian)/Dobrudzha (Dobrodjean) flint (I.K. Nachev, Ch. Nachev 1989, p. 82; M. Gurova 2008, p. 121; M. Gurova, Ch. Nachev 2008, p. 33; B. Mateva 2011, p. 173).

Given this secondary position of the intraclastic-bioclastic cherts and the outcropping limestons with cherts immediately to the south of the study area, the next section will be dealing with the petrographic descriptions of the Ludogorie cherts, their geological context and the possible similarities with the cherts from this study.

4. 3. Ludogorie flint: a review of the petro-archaeological evidence

The Ludogorie flint is one of the siliceous materials recognized through extensive research for prehistoric raw materials in Bulgaria (M. Gurova, Ch. Nachev 2008, p. 31-32). This Lower Cretaceous material is found as nodules in Aptian micrite limestones, north of Novi Pazar, between Ruse and Dobrich (I.K. Nachev, Ch. Nachev 1989, p. 84; Ch. Nachev 2007, p. 258; M. Gurova 2008, p. 121; M. Gurova, Ch. Nachev 2008, p. 33), while a bedded siliceous rock is mentioned in the Popovski Hills region up to Yantra river (I.K. Nachev, Ch. Nachev 1989, p. 84; M. Gurova, Ch. Nachev 2008, p. 34). Two types of Ludogorie flint were differentiated based on thin section characteristics (Tab. 6). In the research context of "Balkan Flint" characterization and provenance, a batch of samples from Neolithic sites in Bulgaria was submitted to Ch. Nachev "for raw material identification by comparative thin-section analysis with flint from known sources across the Moesian Platform" (C. Bonsall *et alii* 2010, p. 11; M. Gurova 2011, p. 98). This "comparative thin-section analysis" proved inconclusive, i.e. archaeological samples were not reliably assigned to a source, especially to outcrops from Ludogorie region (C. Bonsall *et alii* 2010, p. 12), while the use of trace-element analysis outlined the fact that the macroscopically similar samples of K_2 flint from Muselievo and of Ludogorie flint from Ravno have analogous geochemical traits (C. Bonsall *et alii* 2010, p. 13).

The research carried out by L. Manolakakis, I. Ivanov, and J. Delepine (L. Manolakakis 2008, p. 114-116; 2011, p. 228-230), focused on identifying the appropriate raw material for long blade production in the Neolithic sites from NE Bulgaria (large nodules of high-quality), pointed out that K_1 flint is found as medium to small nodules in outcrops from the Beli Lom Valley and as large Aptian and Hauterivian-Barremian blocks at Ravno (tab. 6), the later representing the material mined and used for the production of long blades (L. Manolakakis 2008, p. 116; 2011, p. 230).

Recent petrographic observations and geochemical analysis (P. Andreeva *et alii* 2014, p. 38-41) on chert samples from geological sources and Neolithic sites from north-eastern Bulgaria confirmed and enriched the previous differentiated types (tab. 6). This also allows a comparison with chert microfacies from this study and some similarities to be pointed out, in combination with available information about the geological context of this area.

The petrographic characteristics of Ravno type, abundance of silicified sponge spicules and mudstone to wackestone fabrics (low-energy environment), would point out towards sedimentation in a deep water setting (I.I. Bucur *et alii* 2010b, p. 35; E. Flügel 2010, p. 496), but muddy sediments with high percentage of spicules are also specific to shallow-water shelf carbonates (E. Flügel 2010, p. 496). The location of eluvial deposits of

this chert type matches with the distribution area of Urgonian limestones facies (internal/proximal carbonate platform) of the Ruse Fm (fig. 13/2, tab. 7). Also, the observations of L. Manolakakis (2008) indicate that Ravno type of Ludogorie chert has a broader geological age (Hauterivian-Barremian) than the one suggested by previous research (tab. 6).

The siliceous materials described as "type II" by P. Andreeva *et alii* (2014, p. 38-41) have identical macroscopic appearance with chert microfacies [10a], [10b, [11a], [11ab] from the Lower Danube Valley (fig. 14), but the two petrographic descriptions do not concur regarding the predominant constituents (fig. 15/1-4 for a different interpretation regarding the composition of KRL chert). The illustration for KRL chert from P. Andreeva *et alii* (2014) indicates underestimated non-skeletal grain content and the confusion between silicified small intraclasts and "microcrystalline groundmass". The petrographic characteristics of KRL chert and those of microfacies [10a], [10b, [11a], [11ab] indicate a shallow-marine high-energy depositional setting. The distribution of eluvial deposits of KRL chert corresponds with the limit of Ruse Fm (tab. 7, fig. 13/2): a high-energy platform-margin depositional setting with oolitic/granular limestones (T. Nikolov 1987, p. 76-80; M. Ivanov 1992, p. 70-71; M. Ivanov *et alii* 1997, p. 968-971; B. Peybernes *et alii* 1998, p. 559-562).

P. Andreeva *et alii* (2014, p. 41) describes KRL chert as having an "inhomogenous petrographic composition" related to wide ranges of trace-elements values. Given the fact that KRL chert was found in secondary eluvium (Kriva Reka) and paleo-alluvium (Krasen, Krivnya) deposits, the analysis of these materials failed in more than one way: 1) to separate samples from different geographic locations (sources from Beli Lom river vs. Kriva Reka and other locations) and from different geological contexts (alluvial vs. eluvial) and isolate their characteristics accordingly; 2) to consider and describe the full geological context of KRL chert outcrops (correlating the available geological information with the results of field surveys and the petrographic traits); 3) to properly consider a petrographic diversity normal for alluvial sediments, i.e. to regard Krasen and Krivnya sources from the Beli Lom Valley (and other similar sources) as possibly containing more than one chert type (a case similar to Frăteşti Fm, where the different varieties of intraclastic-bioclastic cherts are associated with K_2 nodular cherts and other rock types); 4) to consider the macroscopic features (i.e. not just colour) as a base for establishing working varieties; 5) to consider the possible existence of more varieties inside KRL chert, as indicated by the chemical variability (very high in samples from Krivnya and Krasen, and more restricted in samples from Kriva Reka, see P. Andreeva *et alii* 2014, fig. 14). Actually there is no "inhomogenous petrographic composition" (P. Andreeva *et alii* 2014, p. 41), only a petrographic diversity overlooked and poorly described, thus poorly understood (see fig. 6, 7, 8 for variability within a defined microfacies, also fig. 9 for an example of colour match and microscopic divergence).

The silicified limestone described as "type III" of Ludogorie chert has both macroscopic and microscopic traits similar to chert microfacies [12a] from the Lower Danube Valley, although the two petrographic descriptions indicate different predominant constituents and thus are conflicting (see fig. 15/4-6 for a different interpretation regarding the primary composition of type III chert). The higher values of Ca and Mg in type III are in accordance with higher percentages of remnant syntaxial overgrowth cement and echinoderm fragments in microfacies [12a] (see fig. 10/2, 10/4, 15/4-6), which are usually composed of low to high Mg-calcite (E. Flügel 2010, p. 106, 270, 295).

Fig. 14. Siliceous materials from SE Romania (1-9) visually similar to Kriva Reka type of Ludogorie chert (10-14): **1-2.** Giurgiu-Malu Roşu (Giurgiu county, Upper Palaeolithic; photo 2 modified after Em. Alexandrescu *et alii* 2007, p. 128); **3.** Ghizdaru-Haltă Quarry (Giurgiu county, alluvial deposit, Frăteşti Fm); **4-5.** Vităneşti (Teleorman county, Eneolithic; modified after O.N. Crandell 2013, p. 142); **6-9.** Baia (Tulcea county, Eneolithic; modified after Fl. Mihail, C.E. Ștefan 2014, p. 274, 276, 277); **10.** Chakmaka outcrop (secondary deposit near Isperih; modified after M. Gurova 2012, p. 33); **11.** Dryanovets (secondary deposit, Razgrad district; modified after M. Gurova 2012, p. 33); **12.** Targovishte-Garata (Chalcolithic; modified after P. Andreeva *et alii* 2014, p. 36); **13.** Kriva Reka (contemporary production centre, Shumen district; modified after P. Andreeva *et alii* 2014, p. 34); **14.** Varna cemetery (late Chalcolithic; modified after P. Andreeva *et alii* 2014, p. 30); scales are 2.5 cm.

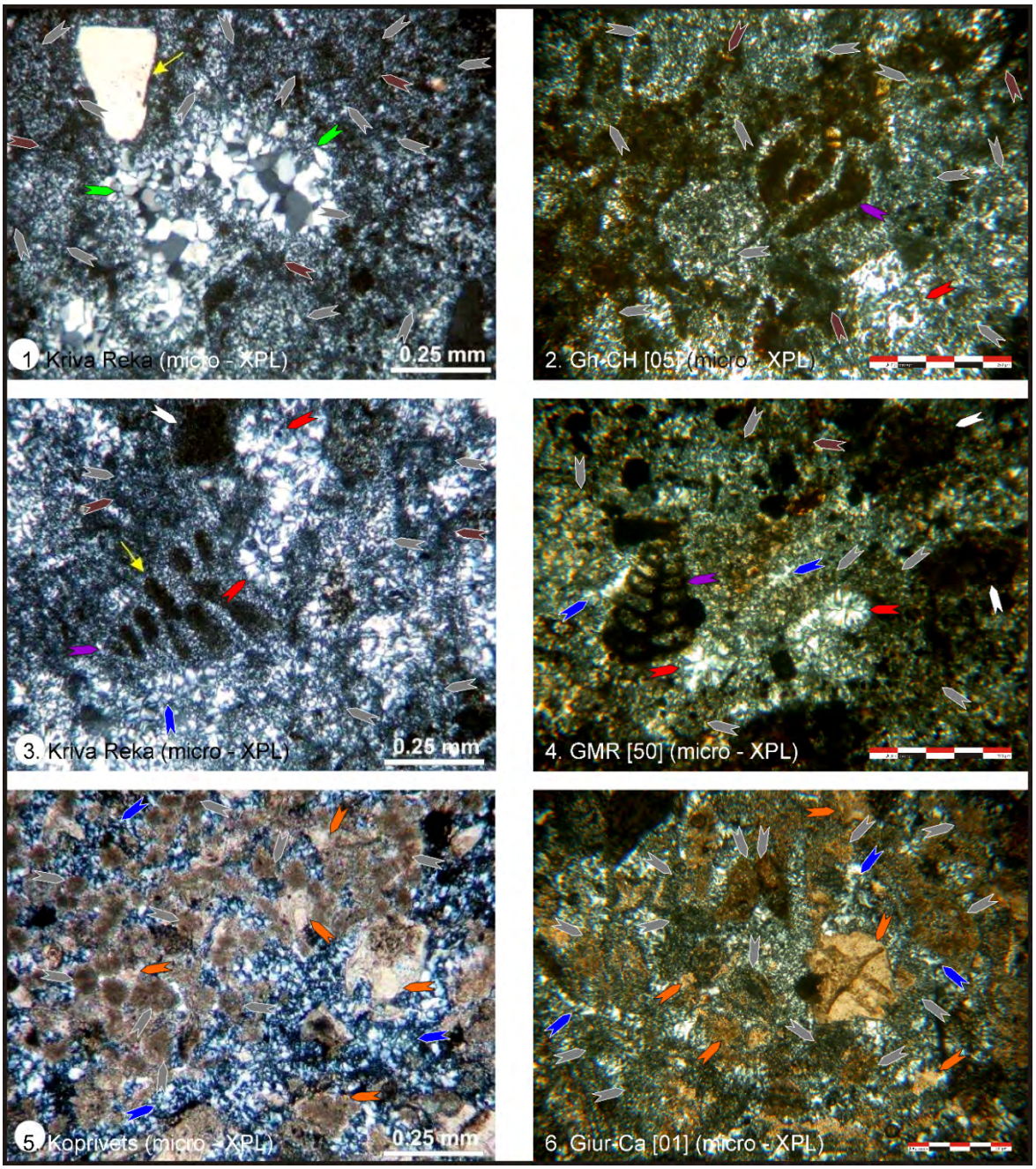

Fig. 15. 1-4. Comparison between KRL and intraclastic-bioclastic cherts: packstone fabric with silicified small intraclasts (grey arrows, underestimated in 1 and 3), fecal pellets (white arrows), benthic foraminifera (purple arrows), moulds of bioclasts (green arrows, megaquartz) and egg-shaped (red arrows); groundmass is composed of remnant matrix (brown arrows) and chalcedony cement (blue arrows); 1, 3 - samples from Kriva Reka, modified after P. Andreeva *et alii* (2014, p. 40), with yellow arrows and the scales from the original images; 2, 4 - samples from Giurgiu-Malu Roşu (4) and Ghizdaru-Haltă Quarry (2), microfacies [10a] and [11a], scales are 250 μm; **5-6.** Comparison between Ludogorie-type III and intraclastic-bioclastic cherts: grainstone fabric; small intraclasts (grey arrows, underestimated in 5), echinoderm fragments (orange arrows) with remnant syntaxial calcite overgrowth cement and botryoidal chalcedony cement (blue arrows); 5 - sample from a quarry near Koprivets, modified after P. Andreeva *et alii* (2014, p. 40), scale is from the original image; 6 - sample from Giurgiu-SW Quarry, microfacies [12a], scale is 500 μm; XPL - cross-polarized light.
1-4. Comparaţie între tipul Kriva Reka de silicolit Ludogorie (1, 3) şi silicolite intraclastic-bioclastice (2, 4); **5-6.** Comparaţie între silicolite Ludogorie-tipul III (5) şi intraclastic-bioclastice (6).

As pointed out by P. Andreeva *et alii* (2014, p. 38), type III chert is found as separate layers within the limestones of Kovachevets Fm (tab. 7, fig. 13/2), which represents a lateral, more distal, extension (southwards) of the platform-margin facies (T. Nikolov 1987, p. 76-80; M. Ivanov, K. Stoykova 1998, p. 125; M. Ivanov *et alii* 1997, p. 968-971; B. Peybernes *et alii* 1998, p. 559-562). Microfacies [11b], [12b] and [12c] (identified only in archaeological contexts, see fig. 10, 12) are more similar in composition with microfacies [12a], medium to coarse grained, macroscopic features indicating lenticular or bedded structure (see Fig. 2/5 and 2/8), possibly representing variants of type III chert with a stronger silicification degree. Considering the fact that there is a difference in silicification degree between microfacies [12a] and the sample from Koprivets (P. Andreeva *et alii* 2014, p. 40), it is possible that the bedded cherts from Kovachevets Fm have different silicification degrees related to different locations in the depositional setting (and also different stratigraphic positions).

Although the evidence and arguments presented here might not be enough for redefining and reinterpreting the KRL chert as intraclastic-bioclastic in composition, the review and comparison of the published data gives a fair idea on the shortcomings of the above mentioned studies: 1) despite the extensive research efforts and many articles published, the KRL chert was inadequately described (considering the large area where these materials were found and the large number of samples collected and analysed) and insufficiently illustrated (a few macroscopic shots and only 3 thin section photographs); 2) the physiographic distribution of the Ludogorie chert types in north-eastern Bulgaria (fig. 13/2) reflects the depositional settings (facies zones) of the Lower Cretaceous marine environments, a geological context simply ignored and unaccounted for by the Bulgarian researchers; 3) these depositional settings imply a certain degree of variability within the limestone deposits and the siliceous materials formed in them, variability in no way presumed and clearly ignored in favour of general traits and more regionally defined chert types; 4) this line of action is the reason for which these studies have failed to identify, describe and isolate more localized traits and thus properly define chert varieties and types; 5) the distribution of alluvial deposits with KRL chert along the Beli Lom Valley (Krasen, Krivnya, Senovo, Ginista, and Dryanovets) and alluvial fans with intraclastic-bioclastic cherts on the left side of Danube (Ghizdaru-Haltă Quarry), not excluding all possible deposits concealed or buried in the last 20000 years, suggests the important role played by paleo-rivers in the erosion, transport and distribution of these siliceous materials in north-eastern Bulgaria and Giurgiu-Călăraşi area, another aspect bluntly ignored by previous research of Ludogorie cherts; 6) the petrographic similarities and the general geological context suggests more than a possible connection between the materials compared here, connection totally ignored because of the one-sided character of the previous investigations.

Raw material	Characteristics	Occurrence and distribution	Reference
Ludogorie flint	from pale brown to beige (smooth fracture), rarely grey (rough fracture); abundant sponge spicules; „micro- and cryptograin chalcedony, moganite and quartz"	ellipsoidal or rod-like nodules in Aptian micrite limestones*, north-eastern Bulgaria	I.K. Nachev, Ch. Nachev 1989, p. 84; Ch. Nachev 2007, p. 258; M. Gurova, Ch. Nachev 2008, p. 33
type Ravno	"cryptocrystalline groundmass" and sponge spicules	Topchii, Kamenovo, Ravno, Koubrat, Belovets, Tetovo and Chereshovo	M. Gurova, Ch. Nachev 2008, p. 33; C. Bonsall *et alii* 2010, p. 11
type I	white cortex, homogenous or zonal texture, mostly beige-ochre-brown colours; "microcrystalline quartz groundmass" with abundant opaque minerals, chalcedonic sponge spicules, silicified sporadic foraminifer tests, thin-shelled bivalves and ostracods; replacement of spiculite mudstone and wackestone carbonates; Al, Na, K and Mg concentrations outline 3 subtypes	oval shaped nodules (sizes between 10-30 cm, but up to 70 cm long) in secondary deposits (Ravno and Tetovo), and archaeological sites	P. Andreeva *et alii* 2014, p. 38, 41
type Kriva Reka	"microcryistalline aggregates with recrystallization of chalcedony"	Goliam Porovets, Dryanovets, Krivnya, and Chukata	M. Gurova, Ch. Nachev 2008, p. 33-34; C. Bonsall *et alii* 2010, p. 11
type II	white and brown cortex; "microcrystalline quartz and chalcedony groundmass" with silicified skeletal grains, sponge spicules, silt-sized clastic quartz grains (5-15%), and "relict carbonate components" (bioclasts, rare peloids and intraclasts, 5-15%); replacement of bioclastic packstone or grainstone carbonates; wide range of Al, Na, K and Mg concentrations	pebbles and cobbles in secondary deposits (Kriva Reka, Krivnya, and Krasen), and archaeological sites	P. Andreeva *et alii* 2014, p. 38, 41
bedded siliceous rocks	"bedded calcareous chert" in vertical alternation with Aptian limestones	the Opaka deposit (Beltsov, Tsenovo, Byala, Golyamo Gradiste, Krepcha, Opaka)	I.K. Nachev, Ch. Nachev 1989, p. 84 ; Ch. Nachev 2007, p. 258; M. Gurova, Ch. Nachev 2008, p. 34
Lower Cretaceous flint	type III: dark brown to dark grey silicified limestone; bioclastic-peloidal packstone or grainstone with chalcedonic groundmass and siliceous sponge spicules; higher concentrations of Ca and Mg compared to KRL and Ravno types.	as separate layers within Kovachevo Fm (Byala, Popovo, Koprivets); in the secondary deposits (Krasen)	P. Andreeva *et alii* 2014, p. 38, 41
	medium (around 30 cm long and 20 cm thick) to small nodules, but also plaques (up to 60 cm long and 20 cm thick), of mediocre to poor quality	as thin layers or high concentration in marly limestones (Chukata, Ginista, Dryanovets, Krivnya, Senovo)	L. Manolakakis 2011, p. 228-229
	large blocks and nodules of very high quality, elongated and globular shapes, with variable sizes up to 40-80 cm long (and up to 1 m), fine- to very fine-grained, brown to beige in fresh break	in Aptian residual mottled reddish clays and Hauterivian-Barremian limestones (Ravno, Topchiyska valley)	L. Manolakakis 2008, p. 114-116; 2011, p. 229-230

* From these flint-rich Aptian limestones two types of secondary deposits were derived: eluvium-proluvium, with angular flint pieces in soft sandy-carbonated masses - Kriva Reka, Tetovo, Kamenovo, Ravno, Chukata near Razgrad (Ch. Nachev 2007, p. 258; M. Gurova, Ch. Nachev 2008, p. 33; C. Bonsall *et alii* 2010, p. 11); Quaternary alluvial/paleo-alluvial with well rounded chert pebbles in sands and gravels - Dryanovets (I.K. Nachev, Ch. Nachev 1989, p. 85; Ch. Nachev 2007, p. 258; M. Gurova, Ch. Nachev 2008, p. 33).

Tab. 6. Characteristics and distribution of Ludogorie flint (north-eastern Bulgaria).
Caracteristicile şi răspândirea silexului Ludogorie (nord-estul Bulgariei).

<table>
<tr><th>Stage</th><th>Sub-stage</th><th colspan="5">Lithostratigraphic units*</th></tr>
<tr><td rowspan="3">Albian</td><td>Upper</td><td>Dekov Fm</td><td colspan="4" rowspan="2">Stratigraphic gap (dry land)</td></tr>
<tr><td>Middle</td><td rowspan="2">anoxic black marls with intercalations of glauconitic sandstones, glauconitic marls with phosphatic nodules (basin)</td></tr>
<tr><td>Lower</td></tr>
<tr><td rowspan="3">Aptian</td><td>Upper</td><td colspan="5">Trambesh Fm</td></tr>
<tr><td>Middle</td><td colspan="5" rowspan="2">clays, marls and rare thin sandstone beds, with interbeds of thin reddish siderites (basin)</td></tr>
<tr><td>Lower</td><td>Ruse Fm</td><td>Razgrad Fm</td><td rowspan="2">Kovachevets Fm
thin-bedded silicified limestones alternating with laminated marls (external/distal platform)</td><td rowspan="2">blue marls</td><td>Gorna Oryahovitsa Fm</td></tr>
<tr><td colspan="2">Urgonian limestones (internal/proximal) and oolitic/granular/bioclastic limestones (rim of the carbonate platform)</td><td>clayey limestones and marls (external/distal platform)</td><td>basinal marls (southern most part of the Moesian Platform)</td></tr>
<tr><td rowspan="2">Barremian</td><td>Upper</td><td colspan="2" rowspan="2">Urgonian limestones with rudists, corals and dasycladales (internal/proximal carbonate platform)
[north-western part of Kubrat region (Chereshovo borehole), Tervel-Sever and Dulovo regions (Pisanets and Preslavtsi boreholes)]</td><td colspan="3" rowspan="2">clayey limestones and marls (external/distal platform)
(Polski Trambesh, Dzuljunica, northern part of Popovo region, Buhovici, Dobrich region)
- Bashbunar Member (Razgrad area), oolitic limestones (southward extension of the platform facies)</td><td rowspan="2">blue clayey marls with sandstone intercalations (external/distal platform)
(Resen, Capaevo, Vasil Drumev)</td></tr>
<tr><td>Lower</td></tr>
<tr><td rowspan="2">Hauterivian</td><td>Upper</td><td colspan="2" rowspan="2">limestones with some coral patch-reefs (internal/proximal carbonate platform)
[north-western part of Kubrat region, Tervel-Sever and Dulovo regions]</td><td colspan="3" rowspan="2">hemipelagic ammonite bearing marls and external/distal limestones with marly intercalations;
- Hitrino limestones (Kaspichan-Hitrino-Novi Pazar region), southward extension of the platform facies</td></tr>
<tr><td>Lower</td></tr>
<tr><td rowspan="3">Valanginian</td><td>Upper</td><td colspan="6">Kaspichan Fm</td></tr>
<tr><td>Lower</td><td colspan="3">micritic limestones, dolostones, dolomitic limestones, carbonates with some coral patch-reefs (internal/ proximal carbonate platform)
[central and eastern parts of N Bulgaria (in drill-holes)]</td><td colspan="3">bioclastic/oolitic carbonates (rim of the carbonate platform)
[in outcrops Devnja-Chernevo-Novi Pazar-Zlatna Niva area]</td></tr>
<tr><td rowspan="2">Berriasian</td><td>Upper</td><td colspan="3" rowspan="2">dolostones, dolomitic limestones and micritic limestones, with coral constructions (lagoonal environments of the internal/ proximal carbonate platform)</td><td colspan="3" rowspan="2">bioclastic/oolitic accumulations (discontinuous rim of the carbonate platform) (in drill-holes)</td></tr>
<tr><td>Lower</td></tr>
</table>

* This table was compiled with geological information from T. Nikolov (1987, p. 76-80), M. Ivanov (1992, p. 69-71), M. Ivanov, K. Stoykova (1998, p. 125-130), M. Ivanov *et alii* (1997, p. 968-971), B. Peybernes *et alii* (1998, p. 559-562), V. Minkovska *et alii* (2002a, p. 187-194; 2002b, p. 41-45), M. Ivanov, V. Idakieva (2013, p. 50-51); Fm – Formation.

Tab. 7. Lower Cretaceous lithostratigraphy of the Eastern Moesian Platform.
Litostratigrafia Cretacicului inferior din partea estică a Platformei Moesice.

4. 4. Looking for KRL chert in Neolithic sites from southern Romania

Although the matter of raw material procurement and use in the Neolithic sites from southern and south-eastern Romania is not the subject of this article, it's important to stress out the presence of materials similar to KRL/intraclastic-bioclastic cherts in this area.

In his overviews on flint types from Neolithic sites in Romania, E. Comşa (1968, p. 26-29; 1973-1975, p. 6-9, 17) doesn't describe a type similar to KRL chert. Despite this, some later accounts of the same author are worthy of attention. Amongst the raw materials used in the Neolithic site at Radovanu (Călăraşi county, Boian-Gumelniţa transition phase), E. Comşa (1980, p. 27; 1986a, p. 44; 1990, p. 30) mentions a reddish opaque flint ("yet unnamed") and considered to be of north-eastern Bulgarian origin based on a petrographic analysis (which he does't publish in these articles). For the lithic assemblage from Măgura Cuneştilor site (Călăraşi county, Gumelniţa culture), E. Comşa (1986b, p. 55; 2001, p. 22-23) describes a greyish opaque flint, found in large numbers in other Gumelniţa sites from Giurgiu area, and a reddish opaque flint, both considered to outcrop in north-eastern Bulgaria. For the same site, L. Niţă, C.E. Ștefan (2011, p. 196) describe two main flint categories, one including fine-grained materials (silex A) and one containing siliceous materials with coarse grained texture, dull, from yellowish cream, reddish brown to light grey or black (silex B). Some of the materials illustrated, though in grey scale, exhibit macroscopic traits specific to KRL cherts (L. Niţă, C.E. Ștefan 2011, fig. 2, 3).

In a raw material study of lithic artefacts from Borduşani-Popină (Ialomiţa county, Gumelniţa culture), C. Haită and M. Tomescu (in S. Marinescu-Bîlcu *et alii* 1997, p. 134) determined two petrographically distinct types of cherts (in their words "silicolites"), one of which is composed of "very frequent and large enough chalcedony recrystallization zones" and has a macroscopically fine-grained texture. Note that the "very frequent and large enough" chalcedony areas might actually correspond to chalcedony cements similar to those observed in the intraclastic-bioclastic cherts from this study (see Section 4. 1.). A later petrographic study by the same authors (C. Haită, M. Tomescu 2006, p. 409) for the raw materials from Borduşani-Popină revealed five varieties of flint, but their description is very short, mostly colour orientated and not enough for a possible connection with KRL chert.

Amongst the raw materials used in Neolithic sites from Teleorman county, O.N. Crandell (2013, p. 129) describes a "local chert" with colours and shades from greyish, yellowish to brownish, opaque and with medium to medium-fine grain, also found in alluvial deposits along the Danube and possibly derived of limestones from the opposite side of the Danube. Some of the illustrated lithic artefacts by O.N. Crandell (2013, p. 142) from Vităneşti site (Teleorman county, Gumelniţa culture) are most certainly KRL cherts (see fig. 14/4-5), but the author doesn't describe them as such, though he is aware of the Ludogorie materials from north-eastern Bulgaria.

Together with the raw materials macroscopicaly determined for the lithic assemblage from Baia site (Tulcea county, Gumelniţa culture), Fl. Mihail, C.E. Ștefan (2014, p. 269, fig. 1, 6, 7) describe as limestone a grey/grey and brown (bicoloured) raw material, and they include a dark brownish material in the Balkan flint category (Fl. Mihail, C.E. Ștefan 2014, fig. 4, 7, 8). These materials are actually KRL cherts (fig. 14/6-9), but the reason why they are not described as such escapes my comprehension.

From my own experience, I can confirm the presence of brownish KRL cherts in Neolithic sites from Neajlov Valley (Bucşani microzone, for the archaeological context see C. Bem *et alii* 2002 and reference therein), more specifically Bucşani-La Pod and Bucşani-La Pădure sites (Gumelniţa culture). A macroscopic determination (performed in 2013,

unpublished) of the raw materials used for Boian lithic artefacts from Creţuleasca-Sit 2 (A3-Bucureşti-Ploieşti Highway, km 7+900 – 8+250, right side of Pasărea Valley, Ilfov county, NE from Bucharest, see P. Damian *et alii* 2012, p. 283-284) revealed that KRL cherts are represented by brownish and grey-rosy varieties, but also the bicolour variety (similar to fig. 14/13, 14/9), illustrating the full reduction sequence (from decortication to core exhaustion).

Of course, this review doesn't prove the existence of KRL chert in Neolithic sites from southern Romania and the evidence is unequal. In the few cases where a petrographic description is available for siliceous materials from Neolithic sites, the characterization is very short and/or orientated on general criteria such as colour, texture, and mineralogy. Whatever colour photos I was able to find in the published papers and my own experience with these materials suggests there is another variety of chert beside the ones recognized by previous research. This short review of the Neolithic research bibliography outlines the fact that these materials, poorly and insufficiently illustrated in other forms than drawings (mostly grey scale and rare colour photographs), are rather overlooked and amalgamated with other types of raw materials or not mentioned at all (here I should quote the whole Neolithic bibliography dealing in some way or another with the knapped lithic findings, but this is pointless).

◈ 5. Discussion

The microfacies analysis of chert samples from Giurgiu-Malu Roşu and Nicolae Bălcescu-La Vii sites (Al. Ciornei *et alii* 2014) demonstrated the existence of two main groups (intraclastic-bioclastic and bioclastic cherts) with many varieties and permitted determining reliable connections between samples from the GMR site and nearby alluvial sources, thus confirming the previous hypotheses put forth by the archaeologists (see above, Section 2).

Due to objective reasons, the field surveys in the area of NB-Vii site were cut short (stopping at Căscioarele Lake, near Oltenița) thus hampering the possibility of comparing samples from the site and from the local raw material supply sources. Although the amount of intraclastic-bioclastic cherts in the NB-Vii raw materials hasn't been quantitatively evaluated after the microfacies analysis, the preliminary estimation suggests a minor contribution to the lithic assemblage, while the K_2 nodular cherts make up the most part, which are petrographically similar to those at GMR site and Căscioarele Lake sampling location (similar microfacies determinations, but with different colours and macroscopic aspects, see Al. Ciornei *et alii* 2014). This raw material acquisition pattern, i.e. the use of fine-grained K_2 cherts from alluvial sources of yet unknown origin, is contrasting with the supply strategies employed at GMR (see below), suggesting and possibly supporting a different cultural tradition and time line for this site in comparison to GMR, in accordance with M. Anghelinu, L. Niţă (2014, p. 185).

Regarding the provenance of intraclastic-bioclastic cherts from Giurgiu-Malu Roşu, it has been established (Ciornei *et alii* 2014, p. 148-149) that some of them (rusty-brownish and rosy-greyish varieties, fig. 2/6-7, 3/2-7, 5, 8, 9) were collected from gravels of Frăteşti Formation (10 km to the N and NW). For the other varieties of intraclastic-bioclastic cherts from Malu Roşu (microfacies [10b], fig. 6) it can only be suspected that they were collected somewhere on the left side of the Danube. It was pointed out (Section 2) that this raw material represents more than 70% of the total chert varieties from Malu Roşu, indicating a local (under 50 km) intensely exploited supply source. This source might be an alluvial deposit chronostratigraphically equivalent to Frăteşti Formation (and similar in what regards

clast's dimensions and shape), found on the Bulgarian side of the Lower Danube Valley or in the Beli Lom Valley (or other river valleys). Since this type of intraclastic-bioclastic chert was not identified in the Bulgarian outcrops where KRL chert was discovered, its source must be a different type of deposit concealed in the same area. This material was also used at Slobozia-Râpa Bulgarilor, probably transported out of Malu Roşu site (if they are considered contemporaneous, as suggested by Al. Păunescu 2000, p. 286), or collected from the same source (inferring a culturally transmitted information about a local and abundant raw material source). For some other intraclastic-bioclastic cherts from GMR (varieties similar to type III of Ludogorie chert, fig. 10, 12) the source could be an alluvial deposit similar to that opened at Krasen, situated more to the south, but probably concealed or not found yet (fig. 13).

The general raw material acquisition pattern for this site (Al. Ciornei *et alii* 2014, p. 149) refers to local available and different alluvial deposits, containing both intraclastic-bioclastic cherts and bioclastic K_2 nodular cherts: Frăteşti Formation, Danube's lower terrace deposits and north-eastern Bulgarian alluvial deposits. Thus, it can be assumed that the mobility pattern of the Palaeolithic people from Malu Roşu included expeditions for raw material provisioning to the N, NW, W and E in a territory of 10-15 km, but also to the S and SE (across the paleo-Danube) in a territory of 50 km. The use of coarse-grained cherts as the predominant raw material in this site represents both a consequence of availability and a conscious preference for its qualities (other than the ease of knapping).

This brings us back to Em. Alexandrescu, B. Soare (2009, p. 56) conclusion regarding the "greyish flint with blue shades and small whitish speckles" as being a low-quality raw material for knapping, resulting in chaotic reduction of the material, with a large quantity of by-products, low amounts of blades and atypical tool morphologies. Against this idea there are a few facts and arguments that support a different view for the GMR raw materials.

First and foremost, atypical tool morphology can't be considered an argument in itself for poor quality raw material. Beyond the initial mental design, technical gestures, and intended function, tool morphology is related to specific uses throughout its life, and consequent resharpening, up to its discard. The large amount of by-products is normal for workshop sites, while the low amount of blades suggests blank selection patterns, given the fact that the blade production is fully documented in the lithic assemblage of GMR.

More so, intraclastic-bioclastic cherts collected from the Frăteşti Formation were favoured against the fine-grained K_2 nodular cherts found in large amounts in the same source (Ciornei *et alii* 2014, p. 149), while fine-grained varieties from Danube's lower terrace deposits were used only sporadically and in small quantities. This might be linked to the fact that coarse-grained lithologies with high content of silica maintain an active cutting edge for a longer time (D.R. Braun *et alii* 2009), and thus suggesting that these intraclastic-bioclastic cherts were preferred for their durability (of course, this remains to be proven by applying the tests from D.R. Braun *et alii* 2009).

In addition, KRL cherts (similar to those from GMR, fig. 14, 15) were used "for large-scale subsistence and household activities during the Chalcolithic period" (P. Andreeva *et alii* 2014, p. 26) and long and extra-long blades (fig. 14/14), at the same time when the Ravno type (a fine-grained material not found in the UP sites from the Lower Danube Valley) was intensely exploited and traded by Neolithic communities from north-eastern Bulgaria, south-eastern and eastern Romania (and beyond). Although the KRL chert was suitable for long blade production (and for any kind of knapping as long as the right techniques and methods

were employed), it seems that the Ravno type was preferred for its availability as large and very large nodules (Section 4. 3.) rather than its grain size.

In the cases presented above (Section 4.4.), the materials considered as KRL cherts (or intraclastic-bioclastic cherts) account for a minor part of the total raw materials (after "Balkan flint" and "Oltenian flint", and even "Moldavian flint"). The presence of KRL cherts in sites lacking local sources with these materials (Vităneşti, Bucşani, Creţuleasca-Sit 2, Borduşani-Popină, Baia) suggests that their procurement and use is not expedient and source constrained (i.e. their availability in near-by sources), also implying some efforts made for their acquisition.

The outlined occurrence of KRL cherts in Neolithic sites from south-eastern Romania (Section 4. 4.), as an extension of their presence in north-eastern Bulgaria (P. Andreeva *et alii* 2014, p. 43), and their earlier utilization in the Upper Palaeolithic sites from Lower Danube Valley, documents the continuous exploitation and use of a raw material type with specific physical properties, stretching on thousands of years. The motives for employing KRL cherts in different times and across a relatively large area (in some cases far from known sources of this material) are an opened problem at this moment. In the current state of research, is hard to associate this exploitation with a possible continuity of the population, nor with some sort of culturally transmitted information regarding the locations of these raw materials and their mode of consumption.

As to the question raised by P. Andreeva *et alii* (2014, p. 26), i.e. "[…] how early in prehistory the exploitation of Ludogorie chert took place", there is no doubt that on the right side of the Danube the KRL cherts were exploited by the Upper Palaeolithic people from Giurgiu-Malu Roşu, Slobozia-Râpa Bulgarilor, and Nicolae Bălcescu-La Vii, long before their use by the Boian and Gumelniţa communities.

◈ 6. Conclusions

The archaeologists working in sites from Lower Danube Valley have been constantly seeking the origin of cherts used as raw materials by Upper Palaeolithic people. The answers always seemed to indicate towards the Bulgarian side of the Moesian Platform. In spite of similar rationalizations, the connection between siliceous materials from Lower Danube Valley and those from northern Bulgaria has neither been proven directly nor pursued systematically. This was due to different importance given to raw material characterization and provenance in these countries (more extensive and organized in Bulgaria, sparse and uneven in Romania), little or no collaboration between Romanian and Bulgarian researchers, and absence or low quality illustration of published chert types. Moreover the research was carried out focusing on irrelevant or misused characterization criteria (for references see Sections 2 and 4. 3.) such as: macroscopic appearance and colour used as the most characteristic and only trait for chert types, some of them having a regional or supra-regional extent; mineralogical composition, always blaming the silica content for monotony of siliceous materials and for the apparent lack of differentiation; age determinations of the raw materials derived solely from a geological context (rarely inferred based on microfauna content of chert samples).

The attempt to prove that Kriva Reka and "type III" cherts have a predominant intraclastic-bioclastic composition (based on published macro and microscopic photos, described petrographic traits, and geological information) and to outline the similarities between such materials used in different archaeological contexts (based on available

archaeological information and a few macroscopic photos) is up to a point polemic and could be deemed "speculative". The basic approach engaged here to argue for these similarities is the review and comparison of published archaeological, petrographical and geological information. Review and comparison are universal investigative tools widely used in the archaeological field (and not exclusively) to evaluate and criticize other researchers' data and to make connections between findings from different areas and contexts, findings to some extent inaccessible directly (due to different reasons). To consider this approach as inadequate or improper undermines and negates the role and effort of publishing the research results. In the current situation one can only ask to what extent is better/more adequate a "comparative thin-section analysis" (see above, Section 4.3) than a "speculative" approach such as the one presented here which makes the necessary connections in a wider framework? Of course, demonstrating a petrographic similarity is preferable to be done through a proper thin section comparison (and other investigative tools), as long as comprehensive criteria are used for basic description.

This article is also signalling a trend in current research of raw material provenancing: the underestimation of petrography as an investigative tool and the employment of geochemical analysis techniques as alternative means of characterization and sourcing. The recent provenance studies of Bulgarian siliceous rocks (Section 4. 3.) provided some conflicting results (the high chemical variability of KRL chert contrasting with its alleged similar general microscopic traits, the geochemical resemblance of two petrographically and geologically distinct materials, i.e. the Ravno type and the Moesian flint) which have thrown reasonable doubt on the efficiency of petrography (focused on the mineralogy) and geochemical analytical techniques (overestimated capacity of characterization and invested with the cape of objectivity) as provenancing tools. Is quite clear from the results of chert characterization from NE Bulgaria, that describing the broad composition, the mineralogy and chemical variability of cherts is not enough, and that all observations have to be completely explained and interpreted in correlation with the original geological and physiographic contexts (i.e. depositional settings and location in the sedimentary basin), but also to consider the secondary geologic positions and the role of the rivers in redistributing cherts in a given area. Such an approach will only produce fruitful results, confirming the original observations (made under the microscope and from analytical results), or revealing faulty or biased observations and interpretations.

The microfacies analysis of the Giurgiu-Călăraşi cherts was carried out on a limited batch of thin sections (but lesser is not necessarily equal to insufficient) from the only two Upper Palaeolithic sites in the area (Section 1) and a reduced number of sampling locations (a research deficiency which impedes a comprehensive spatial distribution of sources). Nonetheless microfacies analysis has proved to be one very efficient tool for understanding and explaining the petrographic diversity ("inhomogeneous petrographic composition") of similarly macroscopic siliceous materials or the related microscopic traits of macroscopically different materials.

I think that the "debatable" and the "speculative" character of this paper is necessary for tackling the raw material characterization of these siliceous materials present in two politically separate territories and in different archaeological contexts, but also to balance the widespread characterizations of the previous works: self-sufficient (based on a large number of samples and sampling locations, but more is not necessarily enough), inadequate (in spite of the large number of samples, the characterization is very thin), territorially restricted (and thus one-sided and ignorant of the possible connections).

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◈ References

Em. Alexandrescu 1996-1998 — Observaţii asupra industriei litice de la Giurgiu-Malu Roşu, *BMJTA*, 2-4 (1996-1998), p. 33-57.

Em. Alexandrescu 1997 — O ipoteză despre evoluţia tehnocomplexului cultural aurignacian din Câmpia Română, *Timpul Istoriei*, I (Memorie şi Patrimoniu), p. 11-36.

Em. Alexandrescu 2000 — O nouă sinteză cu privire la epoca Paleolitică pe teritoriul României, *SCIVA*, 51 (1-2), p. 103-115.

Em. Alexandrescu 2009 — Tehnocomplexul epiaurignacian din Câmpia Română, *BMJTA*, 12, p. 9-53.

Em. Alexandrescu, T. Popa 1996-1998 — Şantierul arheologic Giurgiu-Malu Roşu. Campania 1998, *BMJTA*, 2-4 (1996-1998), p. 59-74.

Em. Alexandrescu *et alii* 2004 — Em. Alexandrescu, S. Balescu, A. Tuffreau, Nouvelles données chronologiques, technologiques et typologiques sur le Paléolithique supérieur ancien de la Plaine roumaine du Danube: le gisement de Giurgiu-Malu Roşu, *L'Anthropologie*, 108 (3-4), p. 407-425.

Em. Alexandrescu *et alii* 2007 — Em. Alexandrescu, T. Popa, A. Ciornei, A. Hriţ, M. Nicolaescu, Giurgiu Malu Roşu, campania 2004. Observaţii asupra industriei litice, *BMJTA*, 9 (2003-2006), p. 97-128.

Em. Alexandrescu, B. Soare 2009 — Studiul petrografic al unor silexuri din situl Giurgiu-Malu Roşu, *BMJTA*, 12, p. 55-62.

I. Andreescu *et alii* 2011 — I. Andreescu, V. Codrea, C. Enache, V. Lubenescu, T. Munteanu, Al. Petculescu, Em. Ştiucă, E. Terzea, Reassessment of the Pliocene/Pleistocene (Neogene/Quaternary) Boundary in the Dacian Basin (Eastern Paratethys), Romania, *Oltenia. Studii şi comunicări. Ştiinţele Naturii*, 27 (1), p. 197-220.

I. Andreescu *et alii* 2013	I. Andreescu, V. Codrea, V. Lubenescu, T. Munteanu, Al. Petculescu, Em. Ştiucă, E. Terzea, New developments in the Upper Pliocene Pleistocene stratigraphic units of the Dacian Basin (Eastern Paratethys), Romania, *QI*, 284, p. 15-29.
P. Andreeva *et alii* 2014	P. Andreeva, E. Stefanova, M. Gurova, Chert raw materials and artefacts from NE Bulgaria: A combined petrographic and LA-ICP-MS study, *Journal of Lithic Studies*, 1 (2), p. 25-45.
M. Anghelinu, L. Niţă 2014	What's in a name: The Aurignacian in Romania, *QI*, 351, p. 172-192.
L. Badea 1997	Cadrul geomorfologic al aşezării paleolitice de la Giurgiu-Malu Roşu, *CCDJ*, 15, p. 9-15.
T. Bandrabur 1966	*Notă explicativă la harta geologică 1: 200000, Foaia Bucureşti (44)*, Comitetul de stat al Geologiei – Institulul Geologic, Bucureşti, 25 p.
T. Bandrabur *et alii* 1966	T. Bandrabur, N. Mihăilă, D. Patrulius, *Notă explicativă la harta geologică 1: 200000, Foaia Giurgiu (49)*, Comitetul de stat al Geologiei – Institulul Geologic, Bucureşti, 20 p.
T. Bandrabur, D. Patrulius 1967	*Notă explicativă la harta geologică 1: 200000, Foaia Călăraşi (45)*, Comitetul de stat al Geologiei – Institulul Geologic, Bucureşti, 24 p.
C. Bem *et alii* 2002	C. Bem, T. Popa, V. Parnic, C. Bem, D. Garvăn, D. Bărbulescu, I. Găluşcă, Cercetări arheologice pe valea Neajlovului. Consideraţii generale asupra microzonei Bucşani, *SP*, 1 (2001), p. 131-146.
C. Bonsall *et alii* 2010	C. Bonsall, M. Gurova, Ch. Hayward, Ch. Nachev, N. Pearce, Characterization of «Balkan flint» artefacts from Bulgaria and Iron Gates using LA-ICP-MS and EPMA, *Interdisciplinary Studies*, 22-23, p. 9-18.
V. Boroneanţ, I. Vlad 1979	Raport preliminar privind cercetările arheologice şi multidisciplinare de la Ciuperceni [judeţul Teleorman] [campania 1978], *MCA*, 13, p. 25-27.
V. Boroneanţ *et alii* 1983	V. Boroneanţ, I. Vlad, E. Terzea, Th. Neagu, V. Serini, P. Coteţ, D. Popescu, T. Postolache, H. Azvadurov, Şt. Roman, M. Cârciumaru, Principalele rezultate ale cercetărilor de la Ciuperceni-Tr. Măgurele, *MCA*, 15, p. 14-16.
D.R. Braun *et alii* 2009	D.R. Braun, Th. Plummer, J.V.Ferraro, P. Ditchfield, L.C. Bishop, Raw material quality and Oldowan hominin toolstone preferences: evidence from Kanjera South, Kenya, *JAS*, 36, p. 1605-1614.
I.I. Bucur *et alii* 2010a	I.I. Bucur, Em. Săsăran, C. Balica, D. Beleş, C. Bruchental, C. Chendeş, O. Chendeş, Al. Hosu, D.Fl. Lazăr, Al. Lăpădat, Al.V. Marian, C. Mircescu, V. Turi, R. Ungureanu, *Mesozoic carbonate deposits from some areas of the Romanian Carpathians – case studies*, Cluj University Press, Cluj, 203 p.

I.I. Bucur *et alii* 2010b — I.I. Bucur, D. Beleş, Em. Săsăran, C. Balica, New data on facies development and micropaleontology of the eastern margin of the Getic Carbonate Platform (South Carpathians, Romania): case study of the Mateiaş Limestone, *Studia Universitatis Babeş-Bolyai Geologia*, 55 (2), p. 33-41.

I.I. Bucur *et alii* 2014 — I.I. Bucur, E. Grădinaru, I. Lazăr, M. Grădinaru, Early Cretaceous micropaleontological assemblages from a condensed section of the Codlea area (Southern Carpathians, Romania), *Acta Palaeontologica Romaniae*, 9 (2), p. 67-84.

M. Cârciumaru *et alii* 2000 — M. Cârciumaru, M. Şeclăman, D.-D. Cârciumaru, Studiul petrografic al materialului litic şi consideraţii geologice asupra surselor de aprovizionare, in M. Cârciumaru (ed.), *Peştera Cioarei Boroşteni. Paleomediul, cronologia şi activităţile umane în Paleolitic*, Ed. Macarie, Târgovişte, p. 39-55.

Al. Ciornei 2013 — *Surse de materie primă, strategii de aprovizionare şi de prelucrare a materiei prime în Paleoliticul din Sectorul Valah al Platformei Moesice*, Unpublished PhD thesis, Mineralogy Department, Geology and Geophysics Faculty, University of Bucharest, Bucharest, 134 p.

Al. Ciornei *et alii* 2014 — Al. Ciornei, I. Mariş, B. Soare, Microfacies analysis of cherts from Upper Palaeolithic sites along the Lower Danube Valley (Romania), *Geo-Eco-Marina*, 20, p. 137-169.

E. Comşa 1968 — Über die Verbreitung und Herkunft einiger von den jungsteinzeitlichen Menschen auf dem Gebiete Rumäniens verwendeten Werkstoffe, *A Móra Ferenc Múzeum Evkőnyve-Szeged*, 1966-1967 (2), p. 25-33.

E. Comşa 1973-1975 — Silexul de tip «balcanic», *Peuce (SV)*, 4, p. 5-19.

E. Comşa 1980 — Săpăturile arheologice de la Radovanu, *MCA*, 14, p. 25-28.

E. Comşa 1986a — Rezultatele săpăturilor arheologice de la Radovanu, *MCA*, 16, p. 41-44.

E. Comşa 1986b — Săpăturile de salvare de pe "Măgura Cuneștilor", *MCA*, 16, p. 53-57.

E. Comşa 1990 — *Complexul neolitic de la Radovanu*, CCDJ, 8, Întreprinderea Poligrafică "Arta Grafică", Călărași, 126 p.

E. Comşa 2001 — L'établissement de "Măgura Cuneștilor" appartenant à la culture de Gumelnitza, *MCA (SN)*, 1 (1999), p. 7-40.

N.J. Conard, M. Bolus 2003 — Radiocarbon dating the appearance of modern humans and timing of cultural innovations in Europe: new results and new challenges, *JHE*, 44, p. 331-371.

A. Conea 1970 — *Formaţiuni cuaternare în Dobrogea*, Editura Academiei R.S.R., Bucureşti, 235 p.

P.V. Coteţ 1969 — Consideraţii morfostructurale, in V. Mihăilescu (ed.), *Geografia Văii Dunării Româneşti*, Ed. Academiei RSR, Bucureşti, p. 23-26.

P.V. Coteţ 1976 — *Câmpia Română. Studiu de geomorfologie integrată*, Ed. Ceres, Bucureşti, 256 p.

O.N. Crandell 2013 — The provenance of Neolithic and Chalcolithic stone tools from sites in Teleorman County, Romania, *BMJT, Seria Arheologie*, 5, p. 125-142.

P. Damian *et alii* 2012 — P. Damian, A. Bâltâc, I. Bocan, C. Borș, S. Cleșiu, Em. Dumitrașcu, I. Ene, C. Lazăr, C. Neagu, S. Oanță-Marghitu, Al. Rațiu, A. Samson, O. Țentea, D. Vleja, G. Vasile, M. Beldiman, Al. Ciornei, S. E. Ene, I. Paraschiv-Grigore, V. Opriș, L. Șendrea, A. Ștefănescu, 161. Crețuleasca, com. Ștefănești de Jos, jud. Ilfov (Autostrada A3 București–Brașov, tronson București – Moara Vlăsiei). Punct: malul drept al văii Pasărea (km 7+900 - 8+250), *Cronica, Campania 2011*, National Institute of Patrimony, Bucureşti, p. 283-284.

A. Doboş 2008 — The Lower Paleolithic of Romania: a critical review, *PaleoAntropology* 2008, p. 218-233.

R. Dobrescu *et alii* 2015 — R. Dobrescu, A. Tuffreau, S. Balescu, Le gisement paléolithique supérieur ancien de la «Vii 1» à Ciuperceni (Vallée du Danube), *MCA (SN)*, 11, p. 19-42.

O.N. Dragastan *et alii* 2005 — O.N. Dragastan, I.St. Popescu, A. Popescu, Early Cretaceous microfacies and algae from the Central – Eastern sectors of the Moesian Carbonate Platform, *Acta Palaeontologica Romaniae*, 5, p. 141-162.

N. Džambazov 1981 — La grotte Samuilica II, *Bulletin de l'Institut d'Archeologie*, 36, p. 5-62.

G.F. Elliott 1986 — Isolated cysts in the Palaeocene-Lower Eocene of Kurdistan, *Palaeontology*, 29, p. 739-741.

P. Enciu 2007 — *Pliocenul şi Cuaternarul din vestul Bazinului Dacic. Stratigrafie şi evoluţie paleogeografică*, Editura Academiei Române, Bucureşti, 228 p.

M. Feru *et alii* 1979 — M. Feru, C. Rădulescu, P. Samson, Biostratigraphie (Micromammifères) des dépôts plio-pléistocènes du domain gétique de la Dépression valaque, *Travaux de l'Institut de Spéologie "Émile Racovitza"*, 18, p. 141-169.

E. Flügel 2010 — *Microfacies of Carbonate Rocks. Analysis, Interpretation and Application*, Second Edition (with a contribution by Axel Munnecke), Springer-Verlag, Berlin-Heidelberg, 984 p.

R.L. Folk, C.E. Weaver 1952 — A study of the texture and composition of chert, *American Journal of Science*, 250, p. 498-510.

R.L. Folk, J.S. Pittmann 1971 — Length-slow chalcedony: a new testament for vanished evaporites, *Journal of Sedimentary Petrology*, 41 (4), p. 1045-1058.

C. Frondel 1978 — Character of quartz fibers, *American Mineralogist*, 63, p. 17-27.

M. Gurova 2008 — Towards an understanding of Early Neolithic populations: a flint perspective from Bulgaria, *DocPraeh*, 35, p. 111-129.

M. Gurova 2011 — Prehistoric flint assemblages from Bulgaria: a raw material perspective, *CCDJ*, 28, p. 96-115.

M. Gurova 2012 — «Balkan Flint» - fiction and/or trajectory to Neolithization: evidence from Bulgaria, *Bulgarian e-Journal of Archaeology*, 1, p. 15-49.

M. Gurova, Ch. Nachev 2008 — Formal Early Neolithic flint toolkits: archaeological and sedimentological aspects, in R.I. Kostov, B.G. Gaydarska, M. Gurova (eds.), *Geoarchaeology and Archaeomineralogy. Proceedings of the International Conference, 29-30 October 2008 Sofia*, St. Ivan Rilski Press, Sofia, p. 29-35.

M. Gurova, C. Bonsall 2014a — Lithic studies: an alternative approach to Neolithization, *Bulgarian e-Journal of Archaeology*, 4, p. 107-135.

M. Gurova, C. Bonsall 2014b — 'Pre-Neolithic' in Southeast Europe: a Bulgarian perspective, *DocPraeh*, 41, p. 95-109.

C. Haită, M. Tomescu 2006 — Petrografia materialului litic descoperit la Borduşani *Popină* în campaniile de cercetări arheologice 1995-1997, *CA*, 13, p. 409-412.

M. Ivanov 1992 — New evidence on the Upper BarremianeLower Aptian ammonite succession in the north of the town of Popovo (North-East Bulgaria). *Comptes rendus de l'Académie bulgare des Sciences – Geologie. Stratigraphie*, 45 (9), p. 69-72.

M. Ivanov, K. Stoykova 1998 — Stratigraphical sequences of the Aptian Stage North of the town of Byala, Ruse District (NE Bulgaria), *Review of the Bulgarian Geological Society* (in Bulgarian, with an English abstract), 59 (3), p. 125-131.

R. Iovita *et alii* 2013 — R. Iovita, A. Doboş, K.E. Fitzsimmons, M. Probst, U. Hambach, M. Robu, M. Vlaicu, Al. Petculescu, Geoarchaeological prospection in the loess steppe: Preliminary results from the Lower Danube Survey for Paleolithic Sites (LoDanS), *QI*, 351, p. 98-114.

M. Ivanov *et alii* 1997 — M. Ivanov, B. Peybernès, T. Nikolov, R. Ciszak, K. Stoykova, V. Minkovska, Essai de correlations sequentielles au Barremien-Aptien dans un systeme plateforme-bassin plateforme le long d'un transect Danube-Cabrovo (Bulgarie du Centre-Nord), *Comptes Rendus de l'Académie des Sciences Paris*, 325, p. 967-972.

M. Ivanov, V. Idakieva 2013 — Lower Aptian ammonite biostratigraphy and potential for further studies of OAE 1a in Bulgaria, *Cretaceous Research*, 39, p. 47-69.

S. Ivanova, S. Sirakova 1995 — Chronology and Cultures of the Bulgarian Palaeolithic, in D.W. Bailey, I. Panayotov (eds.), *Prehistoric Bulgaria*, Monographs in World Archaeology, No. 22, Prehistory Press, Madison Wisconsin, p. 9-54.

S. Ivanova *et alii* 2012 — S. Ivanova, M. Gurova, N. Spassov, V. Popov, J. Makedonska, T. Tzankov, D.S. Strait, Preliminary findings of the Balkan Paleo Project: Evidence of human activity at the "Gateway" of Europe during the Late Pleistocene, *Bulgarian e-Journal of Archaeology*, 2, p. 1-24.

D.C. Jipa 2014 — The loess-like deposits in the Lower Danube Basin. Genetic significance, *Geo-Eco-Marina*, 20, p. 7-18.

P.L. Knauth 1994 — Petrogenesis of chert, in P.J. Heaney, C.T. Prewitt and G.V. Gibbs (eds.), *Silica: Physical Behavior, Geochemistry and Materials Applications*, Reviews in Mineralogy 29, Mineralogical Society of America, Washington, p. 233-258.

J.K. Kozlowski 1979 — Le Bachokirien – la plus ancienne industrie du Paleolithique superieur en Europe (quelques remarques a propos de la position stratigraphique et taxonomique des outillages de la couche 11 de la grotte Bacho Kiro), in J.K. Kozlowski (ed.), *Middle and Upper Palaeolithic in Balkans*, Prace Archeologiczne, Zeszyt 28, Universytet Jagiellonski, Warszawa-Krakow, p. 77-100.

J.K. Kozlowski 2004 — La néolithisation de la zone balkano-danubienne et l'occupation du territoire, *Civilisations*, 52 (1), p. 9-24.

M.J.F. Lawrence 1993 — Sedimentology and petrography of early diagenetic chert and dolomite in the Late Cretaceous-early Tertiary Amuri Limestone Group, eastern Marlborough, New Zealand", *New Zealand Journal of Geology and Geophysics*, 36, p. 9-25.

N. Macarovici 1968 — *Geologia Cuaternarului*, Ed. Didactică şi Pedagogică, Bucureşti, 234 p.

L. Manolakakis 2008 — Open-cast flint mining, long blade production and long distance exchange: an example from Bulgaria, in P. Allard, F. Bostyn, F. Giligny, J. Leach (eds.), *Flint Mining in Prehistoric Europe: Interpreting the archaeological records*, European Association of Archaeologists, 12th Annual Meeting Cracow, Poland, 19th-24th September 2006, BAR (IS), 1891, Archaeopress, Oxford, p. 111-121.

L. Manolakakis 2011 — A flint deposit, a tell and a shaft: a lithic production complex at Ravno 3-Kamenovo? (Early Chalcolithic, North-East Bulgaria), *StudPraeh*, 14, p. 225-244.

Al.V. Marian, I.I. Bucur 2012 — Microfacies of Urgonian limestones from the Perşani Mountains (Eastern Carpathians, Romania), *Acta Palaeontologica Romaniae*, 8 (1-2), p. 3-22.

S. Marinescu-Bîlcu *et alii* 1997 — S. Marinescu-Bîlcu, D. Popovici, G. Trohani, R. Andreescu, A. Bălăşescu, A.-C. Bâlteanu, C. Bem, E. Gal, C. Haită, B. Kessler, D. Moise, V. Radu, M. Tomescu, M. Venczel, Fl. Vlad, V. Voinea, Archaeological researches at Borduşani – Popină (Ialomiţa county) preliminary report 1993 – 1994, *CA*, 10, p. 35-143.

E. Marinova, R. Krauss 2014 — Archaeobotanical evidence on the Neolithisation of Northeast Bulgaria in the Balkan-Anatolian context: chronological framework, plant economy and land use, *Bulgarian e-Journal of Archaeology*, 4, p. 179-194.

F. Mateescu *et alii* 1969 — F. Mateescu, Gh. Niculescu, P. Gâştescu, I. Zăvoianu, I. Mac, A. Breier, Caracterizarea reliefului şi a hidrografiei, in V. Mihăilescu (ed.), *Geografia Văii Dunării Româneşti*, Ed. Academiei RSR, Bucureşti, p. 532-556.

C.N. Mateescu 1970 — Săpături arheologice la Vădastra (1960-1966), *MCA*, 9, p. 67-75.

B. Mateva 2011 — Exploiting flint deposits in Northeastern Bulgaria in the Chalcolithic, in S. Mills, P. Mirea (eds.), *The Lower Danube in Prehistory: Landscape Changes and Human Environment Interactions*, Proceedings of the International Conference, Alexandria 3-5 November 2010, Publicațiile Muzeului Județean Teleorman, III, Ed. Renaissance, Bucureşti, p. 173-178.

P. Mellars 2004 — Neanderthals and the modern human colonization of Europe, *Nature*, 432, p. 461-465.

P. Mellars 2006 — A new radiocarbon revolution and the dispersal of modern humans in Eurasia, *Nature*, 439, p. 931-935.

Fl. Mihail, C.E. Ștefan 2014 — Obiecte din piatră şi materii dure animale descoperite în tell-ul de la Baia, jud. Tulcea, in C.E. Ștefan, M. Florea, S.C. Ailincăi, C. Micu (eds.), *Studies in the prehistory of Southeastern Europe*, Institutul de Cercetări Eco-Muzeale "Gavrilă Simion", Biblioteca Istro-Pontica, Seria Arheologie, Editura Istros, Brăila, p. 263-298.

V. Minkovska *et alii* 2002a — V. Minkovska, B. Peybernès, T. Nikolov, M. Ivanov, Paleogeographic reconstruction of a segment of the North-Tethyan margin in Bulgaria from Barremian to Albian, *Eclogae Geologicae Helvetiae*, 95, p. 183-195.

V. Minkovska *et alii* 2002b — V. Minkovska, B. Peybernès, T. Nikolov, Palaeogeography and geodynamic evolution of the Balkanides and Moesian 'microplate' (Bulgaria) during the Earliest Cretaceous, *Cretaceous Research*, 23, p. 37-48.

V. Minkovska *et alii* 2004 — V. Minkovska, B. Peybernès, P. Cugny, T. Nikolov, Analyse quantitative des faciès carbonatés et cycles T–R de haute fréquence dans le Barrémien du Prébalkan central (Bulgarie), *Comptes Rendus Geoscience - Stratigraphie*, 336, p. 931-938.

C. Mircescu *et alii* 2013 — C. Mircescu, I.I. Bucur, Em. Săsăran, Dasycladalean algae from Upper Jurassic-Lower Cretaceous limestones of Piatra Craiului Massif (South Carpathians, Romania) and their relationship to paleoenvironment, *Studia Universitatis Babeş-Bolyai Geologia*, 59 (1), p. 5-27.

Fl. Mogoşanu, M. Bitiri 1961 — Asupra prezenţei Campignianului în România, *SCIV*, 12 (2), p. 215-226.

Fl. Mogoşanu 1964 — Probleme noi în aşezarea de la Lapoş, *SCIV*, 15 (3), p. 337-350.

V. Mutihac *et alii* 2007	V. Mutihac, M.I. Stratulat, R.M. Fechet 2007, *Geologia României*, Ed. Didactică şi Pedagogică, Bucureşti, 249 p.
R. Mutiu 1997	Mesozoic deposits stratigraphy of Moesian Platform (Romania), *Acta Palaeontologica Romaniae*, 1, p. 88-95.
I.K. Nachev, Ch. Nachev 1989	Distribution and Evolution of Siliceous Rocks in Bulgaria, in J.R. Hein, J. Obradovic (eds.), *Siliceous Deposits of the Tethys and Pacific regions*, Springer-Verlag, New York, p. 81-92.
Ch. Nachev 2007	*Collection from siliceous concretions in the "Earth and Man" Museum – Sofia, Bulgaria*, Fourth International Symposium on "Mineral diversity – research and preservation", 12th - 15th October 2007, Earth and Man National Museum, Sofia, Bulgaria, http://mineraldiversity.org/en/smr4paperse.htm.
C.S. Nicolăescu-Plopşor *et alii* 1956	C.S. Nicolăescu-Plopşor, E. Comşa, Gh. Rădulescu, M.I. Ionescu, Paleoliticul de la Giurgiu. Aşezarea de la Malu Roşu, *SCIV*, 7 (3-4), p. 223-235.
Gh. Niculescu, V. Senecu 1969	Terasele, in V. Mihăilescu (ed.), *Geografia Văii Dunării Româneşti*, Ed. Academiei RSR, Bucureşti, p. 31-41.
T. Nikolov 1987	*The Mediterranean Lower Cretaceous*, Geologica Balcanica, 2 (Series Operum Singulorum), Bulgarian Academy of Sciences, Sofia, 270 p.
L. Niță, C.E. Ștefan 2011	Considerații privind materialul litic din așezarea de la Cunești-"Măgura Cuneștilor", *SCIVA*, 62 (3-4), p. 195-207.
N. Oncescu 1965	*Geologia României*, ediţia a III-a, Ed. Tehnică, Bucureşti, 535 p.
D. Paraschiv 1983	Stages in the Moesian Platform history, in Lucrările Congresului al XII-lea al Asociaţiei Geologice Carpato-Balcanice - Tectonică, Petrol şi Gaze, Bucureşti 1981, *Anuarul Institutului de Geologie şi Geofizică*, 60, p. 177-188.
Al. Păunescu 1970	*Evoluţia uneltelor şi armelor de piatră cioplită descoperite pe teritoriul României*, Biblioteca de Arheologie, XV, Ed. Academiei RSR, Bucureşti, 360 p.
Al. Păunescu 1999-2000	Paleoliticul de la Vădastra, *BMJTA*, 5-6, p. 23-39.
Al. Păunescu 1999	*Paleoliticul şi mezoliticul de pe teritoriul Dobrogei*, vol. II, Ed. Satya Sai, Bucureşti, 241 p.
Al. Păunescu 2000	*Paleoliticul şi mezoliticul din spaţiul cuprins între Carpaţi şi Dunăre*, Ed. Agir, Bucureşti, 496 p.
Al. Păunescu 2001	*Paleoliticul şi mezoliticul din spaţiul transilvan*, Ed. Agir, Bucureşti, 574 p.
Al. Păunescu *et alii* 1962	Al. Păunescu, Gh. Rădulescu, M. Ionescu, Săpăturile din împrejurimile oraşului Giurgiu, *MCA*, 8, p. 127-139.
Al. Păunescu *et alii* 1964	Al. Păunescu, Gh. Rădulescu, M. Ionescu, Cercetări arheologice în raionul Giurgiu, *Revista Muzeelor*, 1 (2), p. 108-114.

Al. Păunescu, Em. Alexandrescu 1997a	Rezultatele preliminare ale cercetărilor privind aşezarea aurignaciană de la Giurgiu-Malu Roşu (campaniile 1992-1996), *CCDJ*, 15, p. 16-59.
Al. Păunescu, Em. Alexandrescu 1997b	Săpăturile arheologice de la Giurgiu-Malu Roşu. Campaniile 1992-1993, *CA*, 10, p. 17-33.
Al. Păunescu, Em. Alexandrescu 1997c	Prima aşezare aurignaciană din Sud-Estul Câmpiei Române, *CCDJ*, 15, p. 60-70.
B. Peybernes *et alii* 1998	B. Peybernès, R. Ciszak. T. Nikolov, M. Ivanov, K. Stoykova, Géométrie des formations et des séquences de dépôt éocrétacées (intervalle Hauterivien-Aptien) de Bulgarie nord-orientale, *Comptes Rendus de l'Académie des Sciences Paris*, 327, p. 555-562.
D. Popescu *et alii* 1961	D. Popescu, N. Constantinescu, Gg. Diaconu, V.I. Teodorescu, Şantierul arheologic Tîrgşor (r. şi reg. Ploieşti), *MCA*, 7, p. 631-644.
Gr. Posea 2006	*Geografia fizică a României. Partea a II-a - Clima, Apele, Solurile, Biogeografia, Hazardele naturale*, ediţia a II-a, Ed. Fundaţiei "România de Mâine", Bucureşti, 236 p.
Em. Protopopescu-Pache, C.N. Mateescu 1959	Deux outils de silex paléolithiques de Vădastra, *Anthropozoikum*, 8 (1958), p. 7-16.
B. Rogala *et alii* 2010	B. Rogala, N.P. James, C.R. Calver, Diagenesis of early Permian high-latitude limestones, Lower Parmeener Supergroup, Tasmania, *Sedimentology*, 57, p. 1771-1790.
H. Rougier *et alii* 2007	H. Rougier, Ş. Milota, R. Rodrigo, M. Gherase, L. Sarcina, O. Moldovan, J. Zilhao, S. Constantin, R.G. Franciscus, Ch.P.E. Zollikofer, M. Ponce de Leon, E. Trinkaus, Peştera cu Oase 2 and the cranial morphology of early modern Europeans, *PNAS*, 104 (4), p. 1165-1170.
M. Săndulescu *et alii* 1978	M. Săndulescu, H. Kräutner, M. Borcoş, S. Năstăseanu, D. Patrulius, M. Ştefănescu, C. Ghenea, M. Lupu, H. Savu, I. Bercia, Fl. Marinescu, *Harta geologică a României*, 1: 1000000, Atlas Geologic, Foaia nr. 1, Institutul de Geologie şi Geofizică, Bucureşti.
Ch. Schmidt *et alii* 2013	Ch. Schmidt, V. Sitlivy, M. Anghelinu, V. Chabai, H. Kels, T. Uthmeier, T. Hauck, I. Băltean, Al. Hilgers, J. Richter, U. Radtke, First chronometric dates (TL and OSL) for the Aurignacian open-air site of Românești-Dumbrăviţa I, Romania, *JAS*, 40, p. 3740-3753.
P.A. Scholle, D.S. Ulmer-Scholle 2003	*A color guide to the Petrography of Carbonate rocks: grains, textures, porosity, diagenesis*, AAPG Memoir, 77, American Association of Petroleum Geologists, Tulsa, 459 p.

V. Sitlivy *et alii* 2012 — V. Sitlivy, V. Chabai, M. Anghelinu, T. Uthmeier, H. Kels, Al. Hilgers, Ch. Schmidt, L. Niţă, I. Băltean, A. Vesselsky, T. Hauck, The earliest Aurignacian in Romania: New investigations at the open air site of Româneşti-Dumbrăviţa I (Banat), *Quartär*, 59, p. 85-130.

V. Sitlivy *et alii* 2014a — V. Sitlivy, M. Anghelinu, V. Chabai, L. Niţă, T. Uthmeier, T. Hauck, I. Băltean, Al. Hilgers, Ch. Schmidt, Placing the Aurignacian from Banat (Soutwestern Romania) into the European Early Upper Paleolithic context, in M. Otte, F. Le Brun-Ricalens (eds.), *Modes de contact et de déplacement au Paléolithique euroasiatique*, Actes du Colloque de la 8e commission (Paléolithique supérieur) de l'UISPP, Liège 29-31 mai 2012, Editions Eraul & ArchéoLogiques, Luxembourg, p. 243-277.

V. Sitlivy *et alii* 2014b — V. Sitlivy, V. Chabai, M. Anghelinu, T. Uthmeier, H. Kels, L. Niţă, I. Băltean, A. Vesselsky, C. Ţuţu, Preliminary reassessment of the Aurignacian in Banat (South-western Romania), *QI*, 351, p. 193-212.

N. Sirakov *et alii* 2007 — N. Sirakov, T. Tsanova, S. Sirakova, S. Taneva, I. Krumov, I. Dimitrova, N. Kovatcheva, Un nouveau faciès lamellaire du début du Paléolithique supérieur dans les Balkans, *Paleo*, 19, http://paleo.revues.org/565.

K. Stoyanov, Em. Gachev 2012 — Recent Landform Evolution in Bulgaria, in D. Loczy, M. Stankoviansky, A. Kotarba (eds.), *Recent Landform Evolution. The Carpatho-Balkan-Dinaric Region*, Springer, Dordrecht-Heidelberg-London-New York, p. 377-412.

N. Teyssandier 2006 — Questioning the First Aurignacian: Mono or Multi Cultural Phenomenon During the Formation of the Upper Paleolithic in Central Europe and the Balkans, *Anthropologie*, 44, p. 10-14.

E. Trinkaus *et alii* 2003a — E. Trinkaus, O. Moldovan, Ş. Milota, A. Bîlgar, L. Sarcina, Sh. Athreya, Sh.E. Bailey, R. Rodrigo, M. Gherase, Th. Higham, Ch.B. Ramsey, J. van der Plicht, An early modern human from the Peştera cu Oase, Romania, *PNAS*, 100 (20), p. 11231-11236.

E. Trinkaus *et alii* 2003b — E. Trinkaus, Ş. Milota, R. Rodrigo, M. Gherase, O. Moldovan, Early modern human cranial remains from the Peştera cu Oase, Romania, *JHE*, 45, p. 245-253.

T. Tsanova 2006 — *Les débuts du Paléolithique supérieur dans l'Est des Balkans. Réflexion à partir de l'étude taphonomique et techno-économique des ensembles lithiques des sites de Bacho Kiro (couche 11), Temnata (couches VI et 4) et Kozarnika (niveau VII)*, Thèse présentée à l'Université Bordeaux 1 (École doctorale: Sciences du Vivant, Géoscience, Sciences de l'environnement), Bordeaux, 544 p.

T. Tsanova 2008 — *Les débuts du Paléolithique supérieur dans l'Est des Balkans. Réflexion à partir de l'étude taphonomique et techno-économique des ensembles lithiques des sites de Bacho Kiro (couche 11), Temnata (couches VI et 4) et Kozarnika (niveau VII)*, BAR (IS) 1752, Archaeopress, Oxford, 326 p.

T. Tsanova 2012 — A diachronic view of flake production from the beginning of the Upper Palaeolithic in the Eastern Balkans, in A. Pastoors, M. Persani (eds.), *Flakes not blades: the role of flake production at the onset of the Upper Palaeolithic in Europe*, Wissenschaftliche Schriften des Neanderthal Museums, 5, Mettmann, p. 215-238.

T. Tsanova *et alii* 2012 — T. Tsanova, N. Zwyns, L. Eizenberg, N. Teyssandier, F. Le Brun-Ricalens, M. Otte, Le plus petit dénominateur commun: réflexion sur la variabilité des ensembles lamellaires du Paléolithique supérieur ancien d'Eurasie. Un bilan autour des exemples de Kozarnika (Est des Balkans) et Yafteh (Zagros central), *L'anthropologie*, 116, p. 469–509.

A. Tuffreau *et alii* 2014 — A. Tuffreau, R. Dobrescu, S. Balescu, Al. Ciornei, Occupations du Paléolithique supérieur ancien dans la Plaine roumaine du Danube à Vădastra-Măgura Fetelor et à Ciuperceni-La Vii 1: industries lithiques, matières premières et déplacements, in M. Otte, F. Le Brun-Ricalens (eds.), *Modes de contact et de déplacement au Paléolithique euroasiatique*, Actes du Colloque de la 8e commission (Paléolithique supérieur) de l'UISPP, Liège 29-31 mai 2012, Editions Eraul & ArchéoLogiques, Luxembourg, p. 279-302.

I. Zagorchev 2009 — Geomorphological zonation of Bulgaria. Principles and state of the art, *Comptes rendus de l'Academie bulgare des Sciences*, 62 (8), p. 981-992.

J.L. Wilson 1975 — *Carbonate Facies in Geologic History*, Springer-Verlag, New York-Berlin-Heidelberg, 471 p.

New information from old collections. Reevaluation of personal adornments made of hard animal materials from the necropolis of Cernica

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Abstract: *The study of the personal adornments category proves to be vital for the understanding of individual and the means of treating the body, at Prehistory level. The purpose of this article is to reevaluate adornments made of hard animal materials, present in the Neolithic necropolis of Cernica. This was researched along a period of 13 years (1961-1974), benefiting also of a monograph, which offered a general picture regarding the disposal of the graves and of the funerary inventory from the necropolis, associated to each skeleton. In a first stage our study aimed to identify the raw materials from which were made the personal adornments from the necropolis of Cernica. In a second stage, in the created groups, were established the typological categories. For each of these was followed the reconstruction of the operational scheme and afterwards the identification of the possible usage marks, by a macro and microscopic analysis, which would indicate the use of the artifacts previously to the deposing of the funeral inventory. Most of the pieces from the Cernica necropolis present usage traces, this may mean that they have been worn also during the life of the individuals and consequently they do not constitute a funerary fitting stricto-senso. Thus we may assume that they were not created exclusively to be deposed as funerary inventory. Moreover, the fact that they present different usage degrees, in the composite adornments, especially when imitations intervene, prove that the broken and irretrievable pieces have been replaced during the "life time" of the adornment.*

Rezumat: *Studiul categoriei obiectelor de podoabă se dovedește vital pentru înțelegerea individului și a modalităților de tratament ale corpului, la nivelul preistoriei. Scopul acestui articol este de a reevalua podoabele confecționate din materii dure animale, prezente în necropola neolitică de la Cernica. Aceasta a fost cercetată pe parcursul a 13 ani (1961-1974), beneficiind și de o monografie, care a oferit un tablou general al dispoziției mormintelor și al inventarului funerar din necropolă, asociat fiecărui schelet. Studiul nostru a urmărit, într-o primă etapă, identificarea materiilor prime din care au fost confecționate obiectele de podoabă din necropola de la Cernica. Într-o a doua etapă, în cadrul grupelor create, au fost stabilite categoriile tipologice. Pentru fiecare dintre acestea, s-a urmărit reconstituirea schemei operaționale și apoi identificarea posibilelor stigmate de uzură, printr-o analiză macro și microscopică, ce ne-ar indica folosirea artefactelor anterior depunerii ca inventar funerar. Majoritatea pieselor din necropola de la Cernica prezintă urme de uzură, ceea ce poate însemna că au fost purtate şi în timpul vieţii indivizilor și, în consecință, ele nu constituie un mobilier funerar stricto-senso. Deci, se poate presupune că nu au fost create exclusiv pentru a fi depuse ca inventar funerar. Mai mult, faptul că ele prezintă grade diferite de uzură, în cadrul podoabelor compozite, mai ales când intervin imitații, dovedește că piesele rupte și irecuperabile, au fost înlocuite pe parcursul ,,vieții" podoabei.*

Keywords: *necropolis, personal adornments, technical transformation scheme, use wear, recycling, symbolism.*

Cuvinte cheie: *necropolă, obiecte de podoabă, schema de transformare, uzură, reciclare, simbolistică.*

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◈ Introduction

The study of the adornments object category proves to be vital for the understanding of the individual and of the body treatment modalities at Prehistory level. These objects were made by and for individuals and worn in direct connection with the human body, so that we can consider them its extension (C. Gamble, M. Porr 2005). Beyond the aesthetic impact, which seems secondary in the traditional societies, the personal adornment represents a language, because it transmits clear messages for the members of the same community or for neighboring communities: they are connected to the ethnic belonging, the social position, the sexual affiliation or the affiliation to an age class. Therefore sociologists (J. M. Sanders 2002) underlined the strong binder between adornment, language and genetics. Moreover, when a primary funerary deposit is studied, correlations can be made concerning the sex and age of the bearer, and in the same time traseological nature observations can also be made – if the adornments were exclusively created in order to be deposed in the funerary inventory or were previously worn and in this case there can be identified the attaching manner, by usage marks. By means of the adornments from the funerary environment, we may construct a vision, even though fragmentary, on the nature of the economic choices (the raw material – the acquisition manner – local or foreign) and technological (making modalities) of the respective communities.

Starting from these general considerations, the purpose of this article is to reevaluate the personal adornments made of hard animal materials, present in the Neolithic necropolis from Cernica. This was researched during a period of 13 years (1961-1974), benefiting even from a monograph (E. Comșa, Gh. Cantacuzino 2001), which offered a general picture of the graves disposition and of the funerary inventory from the necropolis, associated to each skeleton. The flaw of this monograph is that we do not have exact determinations of the sex and age of the buried individuals, determinations which would have been extremely important in order to accomplish a dissociation of the inventories on categories of sex and age, a fact which excludes from the very start the advancing of some hypothesis concerning the existence of a social status earned by birth (ex. consistent inventories in the case of children graves).

We had access to the material preserved in the Bucharest Municipal Museum, deriving from 55 graves, from a total of 82 graves, presenting an inventory made of hard animal materials (E. Comșa, Gh. Cantacuzino 2001). The adornments were identified in 67 graves (370 identified adornments) (tab. 5). For the graves of whose inventories we did not had access at, we tried to use the data from the excavation journals, but also from the monograph. Alas, in quite many situations, these are fragmentary, lacking the information regarding the typology of the pieces and the raw materials out of which were made.

As we have already underlined, we considered the personal adornments because they allow a wider array of considerations, not only of technological type, but especially symbolical. We will try a whole new approach, compared to the one adopted in the necropolis monograph, starting from a set of questions:

- Were there used both exotic and local raw materials?
- Did some of the raw materials have a special symbolic significance?
- To a certain type of object corresponds a specific raw material?
- Can we identify a template of the operational schemes, for the typological categories?
- Were these objects created in order to be deposed as a funerary inventory or were also used during the bearer's lifetime?

Starting from these questions, the study intended, in a first stage, to identify the raw materials (tab. 1, tab. 2, tab. 3) from which were made the personal adornments from the necropolis of Cernica. In a second stage, in the created groups, were established the typological

categories. For each of these was followed the reconstruction of the operational scheme and afterwards the identification of the possible usage marks, through a macro and microscopic analysis, which might indicate the use of the artifacts previously to their deposition as funerary inventory.

◈ Cultural and archaeological data

The site from Cernica is on a prolongation of the terrace (approx. 10 m height), right of the former river Colentina, subsequently transformed in Cernica lake (E. Comșa, Gh. Cantacuzino 2001, p. 7) (fig. 1). Inside this location were discovered settlements and necropolis (fig. 2), pots and ceramic fragments, anthropomorphous plastics, rings, shell or bone adornments (rings, pendants, beads), pearls made of copper mineral, silex tools, stone axes, which belong to several historical periods: Dudeşti culture (Cernica phase), Boian culture (Bolintineanu and Giuleşti phases); Bronze Age, Glina and Tei cultures (settlements), La Tène Age (settlement), XVI-XVII centuries (settlement and necropolis) (Gh. Cantacuzino 1963a, p. 1-13; E. Comșa, Gh. Cantacuzino 2001, p. 10).

The archaeological researches had a systematic character, being led, between 1960-1974, by Gheorghe Cantacuzino (in the area of the Eneolithic necropolis, but also of the settlement and of the medieval necropolis) and Sebastian Morintz (the one who took care of the research in the Neo-Eneolithic settlements).

The necropolis, in the evolution of the funerary conceptions, was constituted by the absence of the graves next of beneath the dwellings, in a *„reservation of the dead separated from the inhabiting area of the living, a fact which mirrors a remarkable evolution of the funerary conceptions and beliefs in the Neolithic"* (Gh. Cantacuzino 1967, p. 386). This belongs to the community of the dead, from where they were not supposed to return in the community of the living, the foundation of the necropolis being strictly connected to the social and economic development of the prehistoric society (Gh. Cantacuzino 1975, p. 232).

The necropolis, thoroughly researched, stretched on a surface of over 12000 m^2 and included a number of 378 graves, which were discovered both on the high side of the terrace, and on the slopes towards the Cernica lake (Gh. Cantacuzino, S. Morintz 1963, p. 27-28; Gh. Cantacuzino 1967, p. 379; E. Comşa, Gh. Cantacuzino 2001, p. 7-10). Next to these graves, on the researched surface were also identified a series of medieval tombs (Gh. Cantacuzino 1963b, p. 361-394; E. Comşa, Gh. Cantacuzino 2001, p. 10). We must underline that only one grave (M356) was discovered in the settlement of Bolintineanu phase of Boian culture, which was at approx. 80-100 m west of the necropolis (Gh. Cantacuzino 1965, p. 56; 1967, p. 379-400; 1973; File 153, p. 56; File 182, p. 19).

The existence of the two main positions for the deposal of the dead – stretched and fetal, discovered at Cernica, have led to controversial discussions regarding the dating of the necropolis. Thus Gheorghe Cantacuzino and Sebastian Morintz considered that the tombs deposed in stretched on the back position belong to the Bolintineanu phase of Boian culture, and the tombs in which were found the skeletons in fetal positions were attributed to the phase Giuleşti of the same culture (Gh. Cantacuzino, S. Morintz 1968, p. 16). Eugen Comşa believes that the necropolis from Cernica – *Iezerul Monastery* belongs to the phase Cernica of Dudeşti culture and includes the skeletons discovered in stretched on the back position (E. Comşa 1992, p. 31-36; E. Comşa, Gh. Cantacuzino 2001, p. 6, 194-198), and the group of tombs which had the skeletons deposed in fetal position on one side would belong to Boian culture (E. Comşa 1992, p. 31-36; E. Comşa, Gh. Cantacuzino 2001, p. 6, 191-193). Recently, D. Șerbănescu published a date of

6095±35 BP[1] (between 5080-4909 CAL BC - calibration data with probability of 95,5%) obtained on a femur, from an individual buried in the M284 tomb (D. Șerbănescu 2015, p. 119-120).

A characteristic of the necropolis from Cernica was remarked by Gheorghe Cantacuzino, regarding the spatial disposition of the graves, observing an unequal repartition on the field. These ones compose more distinct groups (in center, north and south), being separated by empty spaces, but having towards east and west isolated tombs (Gh. Cantacuzino 1967, p. 381). This fact determined the researcher to assert that to each group of tombs corresponds a social group based on family relations (and the dispersed graves were distributed between these large groups or at the necropolis edge), finding similarities in necropolis belonging to the linear ceramic culture in central Europe and Hungary (Gh. Cantacuzino 1965, p. 47; 1967, p. 381; 1970, p. 55; N. Ursulescu, R. Kogălniceanu 2006, p. 14).

At Cernica there were slight differences regarding the orientation, the funerary inventory, but there were not seen differences regarding the inhumation manner according to age or sex categories. The dead were entombed in stretched or fetal position, but there were also some exceptions – the deposals face down.

◈ Funeral inventory

Spondylus

A various array of adornments, from small cylindrical pearls, to belts elements and massive bracelets, were made of valve of *Spondylus* (tab. 1). A first typological category is represented by bilobed or trilobed pearls (fig. 3/a, fig. 4/a), with triangular section, convex extremities and convex-concave sides. The pieces are endowed with two/three perforations, asymmetrically disposed. For the processing of these pieces, in a first stage, out of the valve was extracted a splinter with a rectangular morphology. Yet we cannot reconstruct the proceedings which accompanied the debitage operation, due to the subsequent technological interventions. The bilobed/trilobed morphology was obtained by oblique cuts, progressively deepened. The lack of the characteristics marks of these cuts seem to demonstrate that the piece's shaping was made in a subsequent stage. The perforation was performed by alternative rotation (the specific marks are still visible), bilateral, holding the tool oblique compared to the piece surface, which determined the flared morphology of the perforation walls. On one of the pieces we were able to identify the abandoning of a first perforation plan, nevertheless illustrating both the technique (rotation), and the fact that, for accomplishing the perforation, the perforation plan was alternatively stroke (fig. 3/c).

The deformation manner of the perforations, towards the inner wall (fig. 3/b, fig. 4/b, c, d), can demonstrate the attaching modality of the piece. We wish to underline the very advanced usage, which manifests, in the case of bilobed/trilobed, by deforming the wall between the perforations, almost until fracture (fig. 3/d), and by a pronounced usage facet, developed parallel to the piece's axe, in the area between perforations, which generated, in some cases, the evolution from a triangular section of the pieces, towards a trapezoidal section. The inner side presents a strong polish and, moreover, the area is very flattened and smooth when touched. One of the bilobed pearls, broken at the perforations level, presents an initial perforation, abandoned, maybe with the purpose of recycling, following the advanced usage of the perforations. We may

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assume that there was a catching system, by sawing the piece. Their disposal at the level of the skull, in some graves (ex. M22), allow us to advance the hypothesis of the existence of a bonnet embroidered with these pieces.

Another important typological category is that of the tubular pearls, with straight profile, parallel rectilinear edges and circular section (fig. 5/a). Neither in this case we cannot identify with certitude, the debitage proceedings. Nevertheless, we personally believe in using sawing at least in a final stage of the debitage. By simple percussion (even though we cannot exclude it), cannot be controlled the fracture manner and, in this case, we observe the need of a quite standardized blank. The pieces' surface was entirely shaped, by an extremely fine polishing. The perforation was executed by bifacial rotation from which resulted the slightly flared walls at both extremities, but the specific marks of this procedure are not visible (fig. 5/c). The extremities morphology is generally strongly rounded, with the appearance of a small concave facet (fig. 5/b, fig. 6/b). Moreover, it seems to correspond, in length, to a flattened and fine surface (fig. 5/d, fig. 6/c). We may assume that this is the area affected by the utilization of the pieces. Another example of usage evolution, in an even more advanced stage, consisted in the total elimination of the matter, on the usage facet (fig. 3/e).

The same technical data are actual also for the fusiform and biconvex pearls (fig. 6), the morphological difference being created by the abrasion procedure. The cylindrical pearls seem to have been segmented out of the tubular pearls (perhaps after fracturing), because their extremities are irregularly cut and the perforations are asymmetrical, reported to the piece's axe, from where the conclusion that they derive from already finished pieces.

The biconvex piece of *Spondylus*, identified at the neck level of the individual deposed in M182 (fig. 7/a), presents a flat facet, with polish and a concavity marked off the facet. The perforation is cylindrical, without rotation marks in the inside (fig. 7/b), but with a strong deformation, which corresponds exactly to the flat usage facet (fig. 7/c, d). Obviously the piece was sawn, the friction generating the appearance of the facet. For that matter, by its massiveness it leads the thought straight to a button. A similar piece derives from M251. The same function seems to have had a piece identified in M186 (fig. 5/e). It is characterized by a biconvex shape, with flat facets. It presents polish and concavities of the extremities on both sides (fig. 5/f, g), from where the conclusion that the thread was passed over both sides.

Quite interesting, in the studies concerning the usage evolution, proves to be the valve of *Spondylus* (fig. 8/a, b), found on the pubic bone of the skeleton from M43. Its form was also created by a method of direct shaping, by abrasion. It presents three perforations, accomplished by rotation, and other two initiated but unfinished (fig. 8/c). The usage is characterized by a strong deformation of the two perforations symmetrically placed, deformation accompanied by the appearance of a depression developed on the superior side (fig. 8/d), between perforations and on the inferior side (fig. 8/e), starting from perforation, towards the extremity. We may thus guess that catching system connected the perforations on the superior side and came out on the inferior side. The depression is well defined, it could not appear but after a prolonged pressure, the piece being strongly used before its deposal in the grave. The specialty literature considers these pieces belt elements (S. Bonnardin 2009), the hypothesis being plausible if we also consider the archaeological context of the discovery.

Typological category	Number of pieces	Grave
Bilobed pearl	92	M4, M9, M22, M29, M34, M38, M43, M48 M75, M87bis, M98, M111, M166A, M178, M182, M188, M194, M196, M251, M256, M292
Trilobed pearl	13	M38, M43, M196, M251, M292
Tubular pearl	34	M4, M9, M29, M38, M75, M98, M101, M111, M112, M182, M186, M196, M303
Fusiform pearl	58	M16, M22, M29, M34, M38, M43, M98, M111, M112 M182, M196, M267, M303, M341, M355
Biconvex pearl	8	M34, M75, M178, M267
Cylindrical pearl	21	M22, M38, M43, M48, M77, M101, M103, M111, M120, M256, M267, M303
Belt element	4	M43, M266, M314
Bracelet	2	M83, M141
Button	3	M182, M186, M251
Indeterminate (due to fracturing)	7	M48, M194

Tab. 1. *Spondylus* adornments typology and their disposition in the graves.
Tipologia podoabelor din *Spondylus* și dispunerea lor în morminte.

On the right arm of the individuals buried in M83 and M141 was placed a bracelet made of *Spondylus* valve (fig. 9/a). For the processing of the bracelet was used the natural form of the valve, preserving an area from the cardinal plateau, with the cardinal teeth and pits, in order to confer a special aesthetic aspect. The edges of the pieces seem to have been debited by percussion, after which the debitage plan was thoroughly abrased (fig. 9/b). On the inferior side, it presents a strong polish, with scratches perpendicular to the extremity, which may have developed subsequently to the utilization (fig. 9/e). At this type of piece important is the recycling procedure, namely the appearance of cracks, developed perpendicular to the two openings – on both sides were made perforations (fig. 9/c, d), by rotation, applied from the superior side. In this manner, the extension of the cracks was stopped, by introducing a thread through the perforations and fixing the cracked parts. In this context, the recycling procedure illustrates the special value of this raw material, which determines its strict management, probably generated also by the acquisition difficulties.

Dentalium

Out of *Dentalium* were made only tubular pearls (47 pieces in M29, M101, M103, M196, M267, M341) (fig. 10/a), due to the anatomical limitations imposed by this scaphopoda's shell. Entire *Dentalium*, collected from the beach have a conic form, quite powerfully curved and their length reach, in accordance with the specie, up to 12 times the maximum diameter (G.T. Pope, Y. Goto, 1993). The unfractured extremities have a smooth, thin, sharp side, which cannot be found

at the samples identified in the necropolis, but they do not have an accentuated curved profile and the extremities are rounded, illustrating a segmentation procedure.

The segmentation of the samples from the necropolis is perpendicular or oblique to the fragment's major axe. It was made by bending or by sawing (the experimental studies have proved that, not rarely the fractured extremities were regularized by abrasion on a coarse surface, like the pieces' entire surface, which led to the blurring of the debitage marks, and of this shell's specific model). At the pieces from M101 we were able to identify hardly visible marks on similar objects. First of all, the segmentation procedure by sawing (fig. 10/b, c) is still visible on a couple of pieces, despite the fact that, subsequently, the pieces' surface was smoothly shaped (fig. 10/d). In the same time, the usage evolution is characterized, like the similar morphological pieces, from *Spondylus*, by the appearance of small concavities at the extremity level (fig. 10/e, f), corresponding to a friction facet (fig. 10/g), with macroscopically polish.

Glycymeris

From this bivalve species was made a single typological group - bracelets (fig. 11/a, b) (13 the samples from M43, M68, M88bis, M166A, M178, M188, M267) – through a transformation method by direct shaping, without the intervention of other debitage methods (like bipartition or segmentation), the applied proceeding being the abrasion. It was applied off the superior side, until the obtaining of a large enough orifice. The same abrasion was applied from the opposite side, only at the level of the teeth. All the samples register, at this very same level, a perforation made by unifacial rotation, and our opinion is that it was accomplished previously to the abrasion proceeding, because we cannot identify the starting point of the rotation procedure. The pieces are quite degraded in surface, this is why we cannot establish is the disappearing of the rotation marks from inside the perforation is due to the usage or the sedimentation processes. One of the bracelets from M166A (fig. 11/a), better preserved, allowed us to underline the abrasion plan, with the specific marks (fig. 11/c), and of an intense usage area, in the superior side of the perforation (fig. 11/d), characterized by a flattened surface, with macroscopic polish and by the disappearance of all the technological marks. It is the testimony of an intense friction with a thread.

Bone

A special object inside this necropolis a bilobed pearl, made of bone (fig. 12/a). In our opinion, this object imitates a piece of valve of *Spondylus* meaning that the original piece was fractured and, in lack of this raw material, it was replaced with a morphologically identical piece (fig. 12/b, c), from an available raw material. The second element which draws attention upon this piece is the evolution pattern at the perforations level, which led to the fracturing of both perforations (fig. 12/d). The fact that the fracture appeared at the level of the interior wall only sustains once more the hypothesis that the piece was clamped by a sawing system.

In the necropolis from Cernica also appear a series of pieces with a ringlike morphology, about which we believe that served for clamping a coat (fig. 13/a). They were made on flat blank, obtained from the diaphysis of a long bone, large sized mammal, through a method of longitudinal debitage. We cannot reconstruct the proceedings of obtaining the blank, because the entire surface was submitted to the shaping operation, generally by scraping, superposed by abrasion. The perforation presents a cylindrical morphology, resulted from the perforation by rotation, followed by a perforation enlargement by applying an interior scraping (fig. 13/d). The pieces' form was also given by scraping, hardly identifiable, because it was superposed with a new shaping stage, by abrasion (fig. 13/b, c). This type of pieces present a strong macroscopic

polish, especially at the level of the appendix (fig. 13/e), resulted from manipulation which proves that the used area was mostly the inferior half.

Furthermore, in the necropolis appear rings (fig. 14/a), also made of bone diaphysis, large sized mammal, only this time we are dealing with a procedure of bone segmentation, in rings, obtaining thus blanks in volume. At one of the samples we hardly distinguished sawing marks (fig. 14/b), which illustrate that the segmentation took place with the aid of this technique. In a second stage, the pieces' segmentation plan and also the superior side were shaped by abrasion (fig. 14/c, d). The extremities present a strong polish, which led to erasing the usage marks, determined by their utilization previously to the deposal in the grave.

Out of bone were confectioned exceptional pieces, especially through the thorough technique of shaping. One of the samples presents towards he extremity a stylized feminine representation (fig. 15/a). The piece was identified at the end of the right forearm, next to the right hand. It was made of a long bone diaphysis, large sized mammal, through a longitudinal bipartition method, without being able to identify the procedures succession, due to the subsequent interventions. The breasts were detached through a procedure of alternative sawing (fig. 15/b), bifacial, with still visible marks. The buttocks, like the basin, were underlined by a delineation action (fig. 15/c), made of sawing, after which the abdomen and the buttocks in relief were made with a longitudinal scraping (fig. 15/d), which started from the demarcation line. The legs were outlined by the application of grooving (fig. 15/e). Afterwards the surface of the piece was smoothly polished, by polishing (fig. 15/f). The piece presents a strong polish, more accentuated towards the proximal side (at the level of the legs) (fig. 15/g), following an intense manipulation. It might have been a needle for hair or clamping clothes.

A similar piece derives from M191 – made of diaphysis, large sized mammal, having on the superior side a feminine figure, alas fractured (fig. 16)/a. We do not know the procedures of obtaining the flat blank. The form was given by scraping (fig. 16/b), very obvious in the lateral areas. On the inferior side, the gluteus area was detached by transversal sawing for the delimitation of the area and afterwards by longitudinal scraping, in order to outline the back of the figurine (fig. 16/c). For suggesting the legs, it was created a longitudinal line by grooving (fig. 16/d). On both sides was applied an abrasion, superposed by an usage macroscopic polish, developed especially at the point level, strongly rounded (fig. 16/e).

Another type of needle, with the extremity modeled under the form of three rhombs (fig. 17/a) was identified in the area between the left scapula and the clavicle of the individual buried in M251. We do not know the procedures of obtaining the blank but, as we are dealing with a flat blank, it was used a method of partition or longitudinal extraction. The model was laid out by sawing, hardly identifiable because the surface was smoothly shaped (fig. 17/b). The point, unfortunately broken, was arranged by longitudinal scraping (fig. 17/c). The perforation was obtained by bifacial rotation (fig. 17/d). The area of intense usage, a result of manipulation, develops towards the point, demonstrating that this is an active part (fig. 17/e). The perforation preserves its technological marks, without usage traces, proving that its role was of esthetic nature.

Between the left elbow and the lumbar vertebra of the individual buried in M144, there was a piece made of bone, unfortunately fragmented, so that we were not able to reconstruct its integral morphology (fig. 18/a). The piece was made of a long diaphysis bone, by longitudinal debitage, without being able to identify the procedures. The form was given by lateral scraping (fig. 18/b), superposed by abrasion along the debitage plan (fig. 18/c). Both sides were regularized by scraping (fig. 18/d), until they became flat. At distal level, a biconical perforation is present, accomplished by bifacial rotation (fig. 18/e). The perforation does not present an

intense usage, because we can still identify the starting point of the perforation and the rotation scratches are quite visible, this is why we consider that the piece was not intensely used.

Typological category	Number of pieces	Grave
Ringlike element	5	M22, M37, M82, M88, M284
Ring	17	M17, M22, M32, M54, M77, M82, M87bis, M88bis, M90, M154, M 244C, M251, M267
Needle (?)	4	M13, M101, M191?, M251
Indeterminate	2	M19, M144

Tab. 2. Bone adornments typology and their disposition in the graves.
Tipologia podoabelor din os și dispunerea lor în morminte.

Tooth

The canines of *Cervus elaphus* have been minimally processed, by the making of a perforation which to allow their attaching (fig. 19/a). The procedure used was bifacial rotation (fig. 19/b), without the previous preparation of the plan to be perforated. When intact, the perforation illustrates usage, meaning that, towards the perforation's superior side is accentuated a totally flattened area, in which the rotation scratches are almost entirely erased. It is probably the area of fractioning with the attached thread.

The teeth of *Sus* sp. were transformed in bilobed pearls, illustrating, like in the case of the bone, the utilization of another raw material, in order to imitate the pieces of *Spondylus* (fig. 20/a). They were made by the tooth's longitudinal bipartition, further on the model being cut, possibly by alternative sawing (marks which are impossible to identify, because of the abrasion of the entire surface). The abrasion (fig. 20/b, c) is applied on the entire surface of the piece and is extremely visible, comparing to the pieces of *Spondylus*. The usage is present, being characterized by the development of a usage area and a deformation at the perforations level, with the blurring of the rotation scratches. The usage evolves in the area between the two perforations, where also develops the facet characterized by the marks disappearance and the appearance of the macroscopic polish (fig. 20/d). But, in general terms, the usage is not as accentuated compared to similar pieces of *Spondylus* (where the deformation is strong, until the fracturing in the area between the perforations) from where the conclusion of their subsequent processing and of replacing the fractured pieces (probably of *Spondylus*), from composite adornments.

Typological category	Number of pieces	Grave
Perforated canine	18	M9, M28, M43, M171, M173, M256
Bilobed pearl	8	M9, M34, M38, M43, M98
Trilobed pearl	1	M48
Pendant	2	M127, M225

Tab. 3. Tooth adornments typology and their disposition in the graves.
Tipologia podoabelor din dinți și dispunerea lor în morminte.

In M127 was identified a pendant of canine of *Sus* sp. (fig. 21/a), alas longitudinally fractured. It was made of a longitudinally bipartitioned blank, seemingly by percussion, with the shape arranging by scraping (fig. 21/b), applied on the inferior side and superposed by an abrasion of final regularizing, present especially at the level of debitage edges (fig. 21/c). The perforation was accomplished by unifacial rotation, off the inferior side (fig. 21/d). The specific marks are quite blurred, a fact which demonstrates its previous utilization.

◈ Discussion

The raw material. The study of adornments raises numerous questions regarding their symbolical and social value, but also the circulation routes of the different raw materials. The answers to these questions are important in order to analyze why people made personal adornments and placed them in graves and if the different types of adornments have an individual value for the community from Cernica.

No.	Raw material	Number of pieces	%
1	*Spondylus*	242	67
2	*Dentalium*	47	13
3	Tooth	29	8
4	Bone	28	8
5	*Glycymeris*	13	4

Tab. 4. Numerical distribution of the differents types of raw materials.
Distribuția numerică a diferitelor tipuri de materii prime.

Inside the necropolis from Cernica, the adornments made of allogene raw materials (84%), represents the most representative category, other raw materials being used only sporadically, either for the processing of other typological groups, like in the case of the bone (rings, needles) or tooth (pendants of perforated teeth), either to imitate pearls of *Spondylus*, probably because of the difficulty of their acquisition (tab. 4). It is a deliberate option of these communities to use, preponderantly, raw materials imported from great distances, the specialists considering that the distance on which the materials circulate influencing the sense of importance and power, both for the material, and for the individual who distributes or wears them (M. Helms 1988).

It is obvious that in the necropolis inventory from Cernica, the pieces made of valves of *Spondylus gaederopus* are loaded with symbolic connotations, considering their numerical weight. The two valves have different form and thickness (M.A. Borrello, R. Micheli 2004). The left valve (superior), quite smooth, is more rounded, in the shape of a bonnet, having ears on each side of the ligament and a relief of bristles prominently on the entire surface. On the right valve (inferior), more elongated and thicker, are developed concentric disks, in relief. These different morphologic aspects generated constrictions and determined the selection for the processing of a certain type of object, as also suggested by the material presented in this article. The issue of the species origins has not yet been solved: M. Séfériades (1996, 2000, 2010) or P. Halstead (1993) attributes a Mediterranean origin, denying the existence of this species in the Black Sea. In exchange, H. Todorova (2002) or V. Dimitrijević and B. Tripković (2006) speak about the possibility of an origin in the Black Sea. An often encountered practice at a series of Prehistoric communities is that of utilizing fossil species, but the differentiation between live valves and

fossile ones can be made only through isotopic analysis (J. Shakelton, H. Elderfield 1990; M. Vanhaeren *et alii* 2004). These studies seem to have demonstrated that, at the level of the European Neolithic, were used bivalves deriving from the Mediterranean Sea and not from fossil deposits or from the Black Sea (J. Shakelton, H. Elderfield 1990; B. Bajnóczi *et alii* 2013). M. Miller (2003) brings other arguments in favor of using fresh valves of *Spondylus*, showing that those gathered from the beach are a lot more fragile and tend to fracture during the fabrication process, unlike those gathered alive.

In the case of an import, the variables which may be invoked are those of a direct import of raw material or of already finished pieces and, in the same time, of a direct exchange or from group to group (*kula* type exchanges – Polynesia). The archaeological evidences plead for the very existence of some specialized centers in processing valves of *Spondylus*, like the one from Dimini (Greece) (A. Tsuneki 1989). Moreover, we may invoke a similar situation at the populations from the Trobrian Islands (B. Malinowski 1989). The small perforated disks, from which are made the necklaces which circulates in the *kula* exchange system, are fabricated in only two centers. M. Séfériades (2010) considers that, at the level of the European Neolithic, the objects were manufactured in the centers from the Aegean and Adriatic Sea coast, especially from the actual territory of Greece, Montenegro, Albany and Croatia. For other territories, the rarity and importance of this valve compelled the communities to a recycling of the raw material, in the moment the pieces were fragmented – see the case of Hârşova (D. Galbenu 1963) or Omurtag (Bulgaria) (B. Gaydarska *et alii* 2004).

We cannot neglect the great socio-economic or religious importance of this bivalve, considering its pan-European presence at the level of Neo-Eneolithic. It is estimated at approx. 200 the number of the sites having in their inventory objects of *Spondylus*, from the early Neolithic – the cultures Starčevo and Vinça, until 4.300 BC (V. Dimitrijević, B. Tripković 2006). This form remains printed in the collective mentality, so that, maybe considering the difficulty of its acquisition, was copied in clay in Central Europe or in stone (the "big man" grave from Varna) (M. Séfériades 1996). Interesting is also the fact that, according to the map published by H. Todorova (2000), regarding the distribution of the discoveries of pieces of *Spondylus*, they group around the Black Sea area, the Carpathians basin until Central Europe (north Poland and east Germany) and not in the areas from the proximity of this specie's habitat.

We can invoke a similar situation at the level of the raw materials represented by the valves of de *Glycymeris* and the scaphopoda *Dentalium* (A. Bălăşescu, V. Radu 2004). These types of raw materials only confirm the existence of exchange networks between the community from Cernica and the Mediterranean space.

Obviously, the bones and teeth – having a local provenience, had another signification in the symbolistic of the community from Cernica and maybe an inferior position to the valve of *Spondylus*, because these raw materials were used inclusively in order to imitate the last one. Still, we wish to insist on the case of the perforated canines of *Cervus elaphus* whose symbolic position seem to have been, at least in certain periods, similar to that of the bivalve *Spondylus* (imported or imitated from other raw materials). Thus, they are often searched by the first modern men in Europe, at the level of Aurignacian (Y. Taborin 2004). Despite their absence in certain areas, in the periods of maxim glacial, they are imported from other areas (M. Vanhaeren, F. D'Errico 2005). Moreover, while they are imitated from other raw materials, like in the case of those of stone and antler in the Swiss Neolithic (J. Schibler 1987) or of bones and antler, in the graves from Polgár–Csőszhalom-dűlő 6 (millennium V BC) (A.M. Choyke 2001). They come from a very ancient, Paleolithical tradition, which was abandoned at the level of the Eneolithic from south

Romania, if we consider the fact that, at least in the case of Gumelnița culture, these perforated teeth do not appear in settlements, nor in necropolis.

Transformation schemes. Being a necropolis in discussion, we disposed only of finished pieces, at which a part of the operative chain operations were removed by subsequent interventions. Still we tried to reconstruct the operational schemes which stood at the base of obtaining the adornments. The studied material reveals a great variety of the modalities of transforming the bivalve of *Spondylus*: from bracelets, which make recognizable both the valve's morphology and laterality, to tubular pearls, biconvex pearls, bilobed/trilobed pearls, fusiform pearls, perforated platelets, buttons, starting from which the identification of the anatomic morphology becomes impossible. A. Tsuneki (1989), who studied pearls during fabrication in the site from Dimini (Greece), considers that the pearls were made of the shells' right valve which, according to the same author, fit a lot better to cutting small objects.

The study of the multitude of adornments from *Spondylus* doesn't allow us to establish if, in order to obtain the pearls, was used a transformation scheme by extraction (sawing – for the direct extraction of the future preform) or a scheme which supposed the debitage by successive partition (percussion – in order to obtain splinters closer and closer to the desired morphometry). In the case of the bracelet, it was used a transformation scheme by segmentation, which allowed the conservation of the valve volume (small superposed splinters, covered by subsequent interventions), while the method of debitage by direct shaping appear only in the case of the piece considered a belt element. In the case of the procedures for surface modification, the polishing was the *quasi*-general used technique to produce fine and regulated surfaces. For the procedure of volumes modification, the main technique was perforation, which registers a single variable of execution, namely rotation. Despite the microscope study, the specific marks of a perforation by rotation are visible only in several cases. This is why the specialists assumed the utilization of a technique of *alésage,* destined to regularizing and enlarging the perforation which, finally, creates a perforation with straight walls and a strong smooth aspect (S. Bonnardin 2009). The used equipment was not until now identified. In the case of the bilobed/trilobed pearls, had intervened a second procedure of volume modification: sawing, in order to create the lobes morphology.

The processing of bone rings implied the utilization of a segmentation method of the bone and of obtaining several blanks from a block, by the sawing technique. The shaping stage combined the scraping (interior side) with polishing (exterior side). On the contrary, for the achievement of ringlike pieces, we identified a transformation scheme by longitudinal partition, obtaining a flat blank, in opposition with the blank in volume, specific to the rings of bone. At these pieces, the modification of the volume was made through a perforation by drilling, and of the surface by scraping and abrasion.

The needles made of bone benefited of complex transformation schemes, which supposed, in a first stage, a longitudinal debitage, for obtaining the flat blank. The procedures for the volume modification (the feminine figurine) combined sawing, scraping and grooving, subsequently also intervening a procedure of surface modification, by polishing. For two pieces intervened also the perforation by rotation, for the modification of the piece's volume.

The teeth transformed in pearls suffered the same technological scheme as the similar pearls of *Spondylus*. For the teeth simply transformed in pendants, only a procedure of volume modification intervened, under the form of perforations by rotation.

In the case of the shell of *Dentalium*, because of its natural shape and perforation, presents the advantage of offering predetermined blanks. This is why upon this specie was applied only a transversal debitage, by segmentation, the identified techniques being sawing and flexion.

The valve of *Glycymeris* was modified through a method of direct shaping, with the implication of abrasion as a unique technique for obtaining the blank. It also intervened a perforation procedure, executed by rotation.

The general picture shows us that the techniques and procedures are not too various, they are strongly standardized, inside the same typological groups, but are well adapted to the different types of raw materials, illustrating a good knowledge in their regard. The repetitive elements of the operative chain, present inside the assemblage, illustrate the transmission of knowledge from generation to generation, inside the community which generated them.

Functional hypothesis. The obvious morphological homogeneity, established on series, in the production of the different types of adornments from *Spondylus*, and the identification of several samples in an identic context, illustrate that these pieces were caught in composite ornaments, as we were able to identify also in other specialty studies (S. Bonnardin 2008, 2009; E. Lenneis 2007). The constant presence of a high number of rounded edges and with a small concavity, along a facet longitudinally flat and very smooth when touched, at most of the pearls from *Spondylus* or *Dentalium*, may result, probably from the prolonged friction between piece, the attaching thread and the cloth. In the case of the biforated elements (bilobed/trilobed pearls) or of buttons, where the usage is present exclusively between perforations which, moreover, are deformed, in some cases, until fracture, we may assume their sawing. Sawing or a clamping system is recognizable also in the case of the platelet of *Spondylus*, because the usage incision, marking the thread passage, only affect one side of the piece.

The fact that most of the pieces deriving from the necropolis Cernica present usage traces may signify that they were worn during the individuals' lifetime and, consequently, they do not constitute a funerary inventory *stricto-senso*. Moreover, the fact that they present different usage degrees, in the composite adornments, especially when imitations intervene, prove that the broken are irretrievable pieces, were replaced during the "lifetime" pearl. The usage state of the pieces deposed in Neolithic graves was observed also by other specialists (C. Beldiman *et alii* 2008; A. Polloni 2008; M. Sohn 2008; S. Bonnardin 2009).

It is not obligatory that the personal adornments existing in graves to have been worn by the ones with which they were buried. They may be offerings of the relatives, maybe in the context of death special circumstances etc. It is obvious that these adornments had a special signification in the context of the dead' treatment, but we fail to see the specific significations. The exogenous origins of some raw materials, underline their acquisition through a network of relations with the contemporary groups. The preservation of the social networks may be considered as essential for the long term survival of the Prehistoric groups (R. Whallon 2006). Moreover, they offer information regarding the exchange route map from that period, especially for the bivalves of *Spondylus*.

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No. grave	Sexual determination[2]	Raw material	Typology	Number	Disposition on skeleton	Wear traces
M4	F, 16-17 years	*Spondylus*	Bilobed pearl	1	-	+
			Tubular pearl	2	-	+
M9	F, 45-50 years	*Cervus elaphus* canine	Tooth	1	Inferior half	?
		Tooth	Bilobed pearl	1	Neck	+
		Spondylus	Bilobed pearl	3	Neck	+
			Tubular pearl	2	Neck	+
M13	Child, 7-8 years	Bone	Needle	1	?	?
M16	M, 25-30 years	*Spondylus*	Fusiform pearl	1	?	?
M17	M, 40 years	Bone	Ring	1	One of the hands	?
M19	M, 60 years	Bone	Indeterminate	1	Next to the right forearm	?
M22	M, 25-30 years	*Spondylus*	Bilobed pearl	4	Head level	+
			Cylindrical pearl	1	Head level	+
			Fusiform pearl	1	Head level	+
		Bone	Ringlike element	1	Clavicle	+
			Ring	2	Right hand	+
M28	M, 40 years	Tooth	Perforated tooth	3	Head level	?
M29	M, 30-35 years	*Dentalium*	Tubular pearl	20	Head level	+
		Spondylus	Bilobed pearl	1	Head level	+
			Tubular pearl	2	Head level	+
			Fusiform pearl	2	Head level	+
M32	F, 40-45 years	Bone	Ring	1	Right hand	+
M34	M, 16-18 years	*Spondylus*	Fusiform pearl	1	Head level	+
			Biconvex pearl	1	Head level	+
			Bilobed pearl	9	Head level	+
		Tooth	Bilobed pearl	1	Head level	+
M37	M, 20-25 years	Bone	Ringlike element	1	Left clavicle	+
M38	M, 25-30 years	Tooth	Pearl (?)	1	Head level	?
		Tooth	Bilobed pearl	3	Head level	+
		Spondylus	Fusiform pearl	4	Head level	+
			Tubular pearl	5	Head level	+
			Cylindrical pearl	1	Head level	+
			Bilobed pearl	11	Head level	+
			Trilobed pearl	1	Head level	+

[2] Excepting the person buried in M98, determined by A. Soficaru (Romanian Academy, Institute of Anthropology *Francisc J. Rainer)* (we give thanks in this way), the other determinations were taken from R. Kogălniceanu 2009 (F - female; M - male).

M43	?	*Spondylus*	Trilobed pearl	1	Head level	+
			Bilobed pearl	9	Head level	+
			Cylindrical pearl	4	Head level	+
			Fusiform pearl	12	Head level	+
			Belt element	1	Pubis	+
		Tooth	Perforated tooth	1	Head level	+
			Bilobed pearl	1	Head level	+
		Glycymeris	Bracelet	4	Hands	?
M47	F, 25-30 years	*Ostrea edulis (?)*	Belt element	1	Left shoulder	+
		?	Bead	?	Right shoulder	?
M48	F, 25-30 years	*Spondylus*	Bilobed pearl	2	Neck level	+
			Cylindrical pearl	1	Neck level	+
			Indeterminate pearl	1	Neck level	?
		Tooth	Trilobed pearl	1	Neck level	+
M54	M, 30-35 years	Bone	Ring	1	One of the hands	?
M68	M, 35-40 years	*Glycymeris*	Bracelet	1	Right hand	?
M70	Child, 8-9 ears	?	Bracelet	1	Right humerus	?
M75	Child, 7-8 years	*Spondylus*	Tubular pearl	1	Iliac bones	?
			Biconvex pearl	1	Iliac bones	?
			Bilobed pearl	14	Iliac bones	?
M77	F, 18-19 years	Bone	Ring	1	Left hand	+
		Spondylus	Cylindrical pearl	1	Head level	?
M82	F, 30 years	Bone	Ring	2	Hands level	?
			Ringlike element	1	Right clavicle	?
M83	Child, 5-6 years	*Spondylus*	Bracelet	1	Right hand	+
M87bis	F, 25-30 years	*Spondylus*	Bilobed pearl	3	Scapula level	+
		Bone	Ring	1	Right hand	?
M88	F	Bone	Ringlike element	1	Right humerus	+
M88bis	Child, 5-6 years	*Glycymeris*	Bracelet	3	Left humerus	?
		?	Fusiform pearl	1	?	?
		Shell (?)	Pearl (?)	1	?	?
		Bone	Ring	1	Hands level	?
M90	F, 25 years	Bone	Ring	1	Scapula	?
M95	M, 20-25 years	Shell (?)	Pearl	?	Head level	?
M98	M, 40-50 years	Tooth	Bilobed pearl	2	Clavicle and scapula	+
		Spondylus	Bilobed pearl	12	Clavicle and scapula	+

			Fusiform pearl	2	Clavicle and scapula	+
			Tubular pearl	1	Clavicle and scapula	+
M101	F, 25-30 years	Bone	Indeterminate (Needle?)	1	Next tot the right hand	+
		Dentalium	Tubular pearl	22	Neck level	+
		Spondylus	Cylindrical pearl	4	Neck level	+
			Tubular pearl	1	Neck level	+
M103	F, 45 years	*Dentalium*	Tubular pearl	2	Under mandible and head	?
		Spondylus	Cylindrical pearl	1	Under mandible and head	?
M111	?	*Spondylus*	Tubular pearl	3	Front level	+
			Fusiform pearl	9	Front level	+
			Cylindrical pearl	3	Front level	?
			Bilobed pearl	1	Front level	?
M112	M, 18 years	*Spondylus*	Fusiform pearl	1	Next to the skeleton	?
			Tubular pearl	2	Next tot the skeleton	?
M113	M, 35 years	Shell (?)	Biconvex pearl	1	Head level	?
M115B	?, 20-25 years	Shell (?)	Pearl (?)	2	Head level	?
M120	F, 40 years	*Spondylus*	Cylindrical pearl	3	On the head	?
M127	M, 45-50 years	Tooth	Pendant	1	Next tot the ulna	+
M141	M, 35 years	*Spondylus*	Bracelet	1	Right hand	+
M144	F, 17-19 years	Bone	Indeterminate	1	Left elbow and lumbar vertebrae	?
M154	?	Bone	Ring	1	In the pit	?
M166A	F, 15 years	*Spondylus*	Bilobed pearl	2	Head level	+
		Glycymeris	Bracelet	2	Right shoulder	+
M171	F	Tooth	Perforated tooth	9	Head level	?
M173	F, 20-25 years	Tooth	Perforated tooth	?	Neck level	?
M178	M	*Spondylus*	Bilobed pearl	2	Mandible	+
			Biconvex pearl	2	Mandible	+
		Glycymeris	Bracelet	1	Right humerus	?

M182	F, 25-30 years	*Spondylus*	Button	1	Neck level	+
			Tubular pearl	3	Neck level	+
			Bilobed pearl	4	Neck level	+
			Fusiform pearl	1	Neck level	+
M186	M, 17-18 years	*Spondylus*	Tubular pearl	1	Left hand	+
			Button	1	Iliac bone	+
M188	M, 35 years	*Spondylus*	Bilobed pearl	2	Neck level	?
		Glycymeris	Bracelet	1	Right elbow	?
M191?	?	Bone	Decorated needle	1	?	+
M194	F, 25-30 years	*Spondylus*	Bilobed pearl	1	Neck level	?
			Pearl (?)	6	Neck level	?
M196	M, 45 years	*Dentalium*	Tubular pearl	1	Clavicle	+
		Spondylus	Trilobed pearl	2	Clavicle	+
			Bilobed pearl	2	Clavicle	+
			Fusiform pearl	3	Clavicle	+
			Tubular pearl	1	Clavicle	+
M225	M, 50 years	Tooth	Pendant	1	?	?
M236	?	Shell (?)	Pearl (?)	?	Right shoulder	?
M241A	F, 30 years	Shell (?)	Pearl (?)	1	Stern	?
M244C	?	Bone	Ring	1	Right hand	+
M251	F, 45-50 years	Bone	Needle?	1	Between left scapula and clavicle	?
			Ring	1	Right hand	?
		Spondylus	Button	1	Head level	+
			Bilobed pearl	7	Head level	+
			Trilobed pearl	4	Head level	+
		Shell (?)	Cylindrical pearl	?	Head level	?
			Fusiform pearl	?	Head level	?
M256	F, 40 years	*Spondylus*	Bilobed pearl	?	Neck level	?
			Cylindrical pearl	?	Neck level	?
		Tooth	Perforated tooth	4	Neck level	?
M266	F, 35 years	*Spondylus*	Belt element	1	?	?
M267	F, 35-40 years	*Glycymeris*	Bracelet	1	Left elbow	+
		Spondylus	Fusiform pearl	3	Neck level	+
			Biconvex pearl	4	Neck level	+
			Cylindrical pearl	1	Neck level	+
		Dentalium	Tubular pearl	1	Neck level	+
		Bone	Ring	2	Right hand	+
			Ring	1	Left hand	+

M284	?	Bone	Ringlike element	1	Right scapula	?
M292	F, 45 years	*Spondylus*	Trilobed element	5	Head level	?
			Bilobed pearl	2	Thorax level	?
M303	F, 25-30 years	*Spondylus*	Cylindrical pearl	1	Neck	+
			Tubular pearl	10	Neck	+
			Fusiform pearl	11	Neck	+
M314	M, 55 years	*Spondylus*	Belt element	2	Backbone level	?
M340	?	Shell (?)	Pearl (?)	?	Neck	?
M341	F, 55 years	*Dentalium*	Tubular pearl	1	Between right humerus and forearm	+
		Spondylus	Fusiform pearl	4	Between right humerus and forearm	+
M342	F, 14-18 years	Shell (?)	Pearl (?)	2	Head level	?
M354	M, 25-30 years	Shell (?)	Tubular pearl	?	On the scapula and neck	?
M355	F, 35-40 years	*Spondylus*	Fusiform pearl	3	Temporal bone	+

Tab. 5. Disposition of the personal adornments in the Cernica necropolis**.**
Dispunerea podoabelor în necropola de la Cernica.

◈ Bibliography

B. Bajnóczi *et alii* 2013 — B. Bajnóczi, G. Schöll-Barna, N. Kalicz, Zs. Siklósi, G.H. Hourmouziadis, F. Ifantidis, A. Kyparissi-Apostolika, M. Pappa, R. Veropoulidou, Ch. Ziota, Tracing the source of Late Neolithic *Spondylus* shell ornaments by stable isotope geochemistry and cathodoluminescence microscopy, *JAS*, 40 (2), p. 874-882.

A. Bălăşescu, V. Radu 2004 — *Omul şi animalele. Strategii şi resurse la comunităţile Hamangia şi Boian*, Biblioteca Muzeului Național, Seria Cercetări Pluridisciplinare, 9, Ed. Cetatea de Scaun, Târgoviște.

C. Beldiman *et alii* 2008 — C. Beldiman, C. Lazăr, D.-M. Sztancs, Necropola eneolitică de la Sultana-*Malu-Roşu*, com. Mânăstirea, jud. Călăraşi. Piese de podoabă din inventarul M1, *BMJTA*, 11, p. 59-72.

S. Bonnardin 2008	From traces to function of ornaments: some Neolithic examples, in L. Longo, N. Skakun (eds.), *Prehistoric Technology 40 Years Later: Functional Studies and the Russian Legacy*, BAR (IS), 1783, Archaeopress, Oxford, p. 297-308.
S. Bonnardin 2009	*La parure funéraire au Néolithique ancien dans les Bassins parisien et rhénan Rubané, Hinkelstein et Villeneuve-Saint-Germain*, Societé Préhistorique Française, Mémoire XLIX, Paris.
M.A. Borrello, R. Micheli 2004	*Spondylus gaederopus*, gioiello dell'Europa preistorica, *Preistoria Alpina*, Suppl. 1, 40, p. 71-82.
Gh. Cantacuzino 1963a	*Raport preliminar privind cercetările arheologice executate în 1963 de şantierul Cernica al Academiei R.S.R.*, manuscris din Arhiva Institutului de Arheologie ,,Vasile Pârvan", Bucureşti, p. 1-13.
Gh. Cantacuzino 1963b	Unele probleme istorice privind aşezările medievale muntene în lumina cercetărilor arheologice de la Cernica, *SCIV*, XIV (2), p. 361-394.
Gh. Cantacuzino 1965	Observations concernant les rites funéraires néolithiques de la nécropole de Cernica, *Dacia (NS)*, IX, p. 45-58.
Gh. Cantacuzino 1967	Necropola preistorică de la Cernica şi locul ei în neoliticul românesc şi european (în lumina ultimelor descoperiri arheologice), *SCIV*, XVIII (3), p. 379-400.
Gh. Cantacuzino 1970	La nécropole de Cernica. Sa place parmi les civilisations néolithiques de l'Europe, *Archeologia*, 35, p. 54-61.
Gh. Cantacuzino 1973	*Carnet Cernica 26/1973*, Arhiva Institutului de Arheologie ,,Vasile Pârvan", Bucureşti, mss.
Gh. Cantacuzino 1975	Morminte cu scheletele aşezate pe torace din necropola neolitică de la Cernica şi semnificaţia acestui ritual preistoric, *Muzeul Naţional*, 2, p. 224-235.
Gh. Cantacuzino Dosar 153	Fond Gh. Cantacuzino, *Dosar 153*, Arhivele Naţionale ale României, mss.
Gh. Cantacuzino Dosar 182	Fond Gh. Cantacuzino, *Dosar 182*, Arhivele Naţionale ale României, mss.
Gh. Cantacuzino, S. Morintz 1963	Die Jungsteinzeitlichen funde in Cernica (Bukarest), *Dacia (NS)*, VII, p. 27-89.
Gh. Cantacuzino, S. Morintz 1968	Descoperirile arheologice de la Cernica şi importanţa lor pentru cunoaşterea vechilor culturi din ţara noastră, *Bucureşti. Materiale de Istorie şi Muzeografie. Muzeul Municipiului Bucureşti*, VI, p. 7-26.
A.M. Choyke 2001	Late Neolithic red deer canine beads and their imitations, in A. Choyke, L. Bartosiewicz (eds.), *Crafting bone: skeletal technologies through time and space*, BAR (IS), 937, Archaeopress, Oxford, p. 251-266.

E. Comşa 1992	Despre datarea necropolei neolitice de la Cernica, *Cercetări Arheologice în Bucureşti. Muzeul Municipiului Bucureşti*, IV, p. 31-36.
E. Comşa, Gh. Cantacuzino 2001	*Necropola neolitică de la Cernica*, Ed. Academiei Române, Bucureşti.
V. Dimitrijević, B. Tripković 2006	*Spondylus* and *Glycymeris* bracelets: trade reflections at Neolithic Vinça-Belo Brdo, *DocPraeh*, XXXIII, p. 237-252.
D. Galbenu 1963	Neolitičeskaja masterskaja dlja obrabotki ukrašenij v Chyršove, *Dacia (NS)*, 7, p. 501-509.
C. Gamble, M. Porr 2005	From Empty Spaces to Lived Lives: Exploring the Individual in the Palaeolithic, in C. Gamble, M. Porr (eds.), *The Hominid Individual in Context: Archaeological Investigations of Lower and Middle Paleolithic*, Routledge, London, p. 1-12.
B. Gaydarska *et alii* 2004	B. Gaydarska, J.C. Chapman, I. Angelova, M. Gurova, S. Yanev, Breaking, making and trading: the Omurtag Eneolithic *Spondylus* hoard, *ArchB*, VIII(2), p. 11-33.
P. Halstead 1993	*Spondylus* shell ornaments from late Neolithic Dimini, Greece: specialized manufacture or unequal accumulation?, *Antiquity*, 67, p. 603-609.
M. Helms 1988	*Ulysses' Sail: An Ethnographic Odyssey of Power, Knowledge, and Geographical Distance*, Princeton University Press, New Jersey.
R. Kogălniceanu 2009	*Primele necropole din Neoliticul şi Eneoliticul României*, Teză de doctorat susținută la Universitatea Al.I. Cuza Iași, mss.
E. Lenneis 2007	Mesolithic heritage in early Neolithic burial rituals and personal adornments, *DocPraeh*, XXXIV, p. 129-137.
B. Malinowski 1989	*Les argonautes du Pacifique Occidental*, Gallimard, Paris.
M. Miller 2003	Technical Aspects of Ornament Production at Sitagroi, in E.S. Elster, C. Renfrew (eds.), *Prehistoric Sitagroi: Excavations in Northeast Greece, 1968-1970,* Vol. 2, University of California, Cotsen Institute of Archaeology, Los Angeles, p. 369-382.
A. Polloni 2008	Parures individuelles et sépultures collectives à la fin du Néolithique en Bassin parisien, *Préhistoire Anthropologie Méditerranéennes,* 14, p. 75-89.
G.T. Pope, Y. Goto 1993	*European seashells II. Scaphopoda, Bivalvia, Cephalopoda*. Hemmen, Weisbaden.
J.M. Sanders 2002	Ethnic Boundaries and Identity in Plural Societies, *Annual Review of Sociology*, 28, p. 327-57.
J. Schibler 1987	Die Knochenartefakte, in E. Gross (ed.), *Zürich "Mozartstrasse": Neolithische und bronzezeitliche Ufersiedlungen*, Vol. 1. Berichte der Zürcher Denkmalpflege, Monograph 4, Orell Füssli, Zürich, p. 167-175.

M. Séfériades 1996 — La route néolithique des spondyles de la Méditerranée a la Manche, in M. Otte (ed.), *Nature et culture, Colloque de Liege (dec. 1993)*, Liège, *ERAUL*, 68, p. 289-356.

M. Séfériades 2000 — *Spondylus gaederopus*: the earliest European long distance exchange system, in S. Hiller, V. Nikolov (eds.), *Karanovo III. Beiträge zum Neolithikum in Südosteuropa*, Phoibos Verlag, Wien, p. 423-437.

M. Séfériades 2010 — *Spondylus* and Long-Distance Trade in Prehistoric Europe, in D.W. Anthony (ed.), *The Lost World of Old Europe. The Danube Valley. 5000 – 3500 B.C.*, Princeton University Press, Princeton, p. 179-190.

J. Shakelton, H. Elderfield 1990 — Strontium isotope dating of the source of Neolithic European *Spondylus* shell artefacts, *Antiquity*, 64, p. 312-315.

M. Sohn 2008 — Entre signe et symbole: les fonctions du mobilier dans les sépultures collectives d'Europe occidentale à la fin du Néolithique, *Préhistoire Anthropologie Méditerranéennes*, 14, p. 53–71.

D. Şerbănescu 2015 — Considerații privind datarea necropolei neolitice de la Cernica, județul Ilfov, in C. Schuster, C. Tulugea, C. Terteci (eds.), *Buridava*, XII/I, *Symposia Thracologica, X, Volum dedicat profesorului Petre I. Roman la cea de-a 80-cea aniversare*, Râmnicu Vâlcea, p. 116-122.

Y. Taborin 2004 — *Langage sans parole: la parure aux temps préhistoriques*, La Maison des roches, Paris.

H. Todorova 2000 — Die *Spondylus* – Problematik heute, in S. Hiller, V. Nikolov (eds.), *Karanovo, Bd. III. Beiträge zur Neolithikum in Südosteuropa*, Phoibos Verlag, Wien, p. 75-109.

H. Todorova 2002 — Die Mollusken in den Gräberfeldern von Durankulak, in H. Todorova (ed.), *Durankulak. Die prehistorichen Gräberfeldern von Durankulak*, Band 2, 1. Deutsches Archäologisches Institut-Berlin and Anubis Ltd., p. 177-190.

A. Tsuneki 1989 — The manufacture of *Spondylus* shell objects at Neolithic Dimini, Greece, *Orient*, 25, 1-21.

N. Ursulescu, R. Kogălniceanu 2006 — Apparition des nécropoles dans le néolithique de Roumanie et de l'Italie, *SAA*, XII, p. 11-42.

M. Vanhaeren *et alii* 2004 — M. Vanhaeren, Fr. d'Errico, I. Billy, F. Grousset, Tracing the source of Upper Palaeolithic shell beads by strontium isotope dating, *JAS*, 31(10), p. 1481-1488.

M. Vanhaeren, F. d'Errico 2005 — Grave goods from the Saint-Germain-la-Rivière burial: Evidence for social inequality in the Upper Palaeolithic, *JAA*, 24, p. 117-134.

R. Whallon 2006 — Social networks and information: Non-"utilitarian" mobility among hunter-gatherers, *JAA*, 25, p. 259-270.

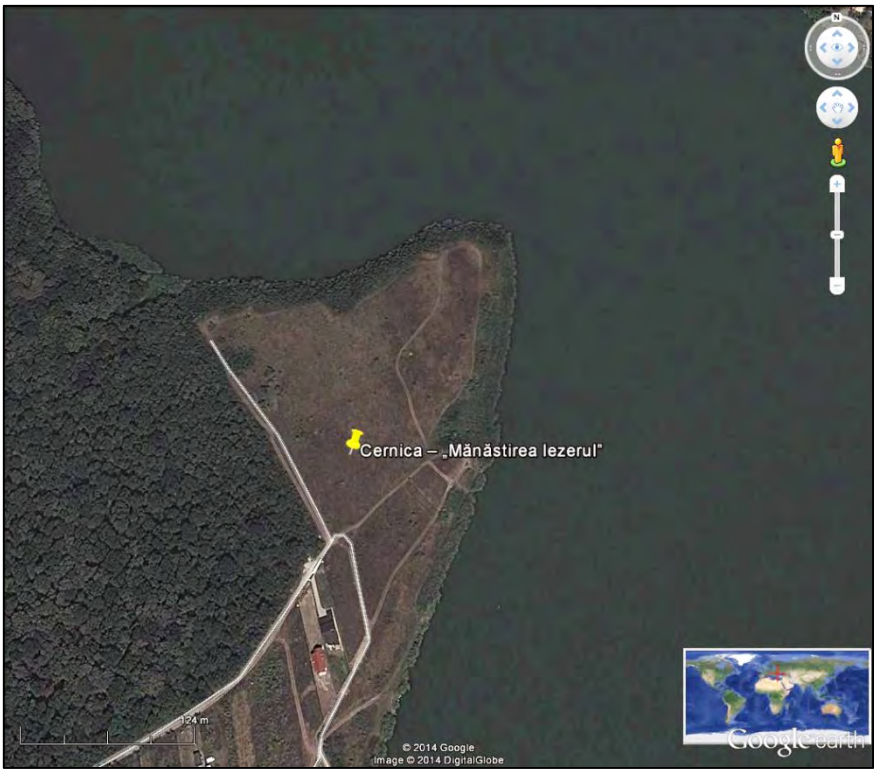

Fig. 1. Location of the necropolis from Cernica.
Amplasarea necropolei de la Cernica.

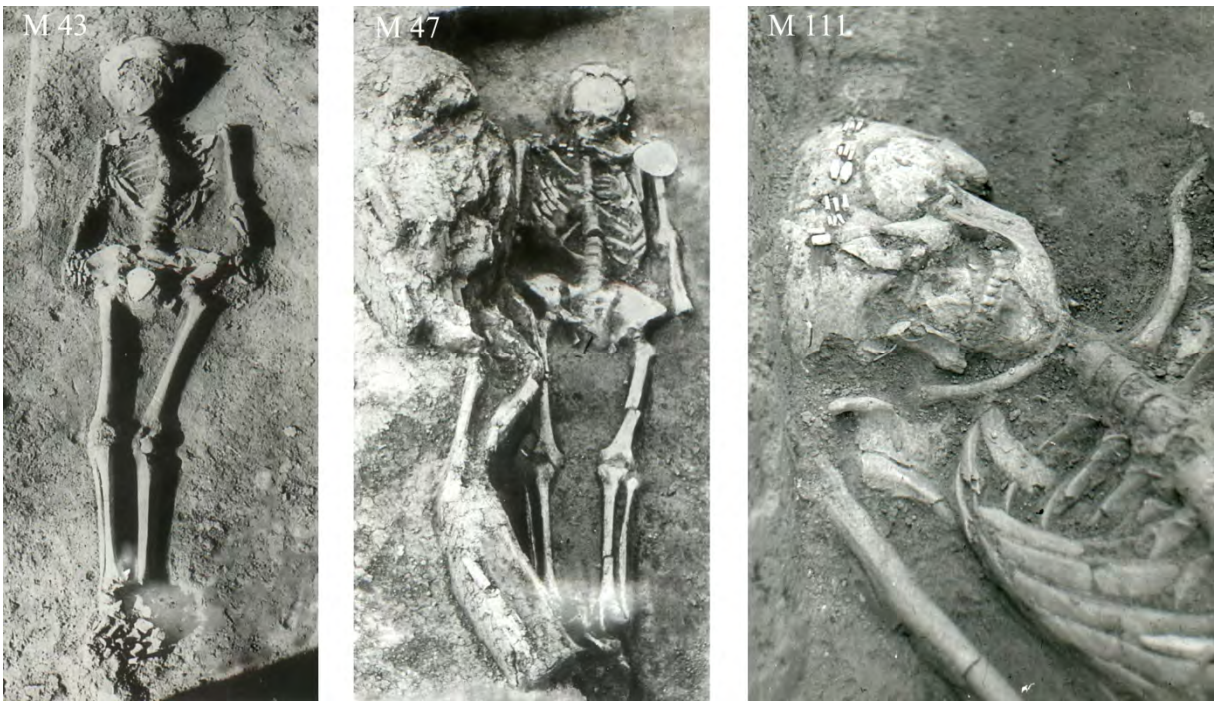

Fig. 2. Details of the graves discovered in the necropolis from Cernica (photo after diapositives from the Bucharest Municipal Museum).
Detalii ale mormintelor descoperite în necropola de la Cernica (foto după diapozitive aflate în colecția Muzeului Municipiului București).

Fig. 3. Personal adornments made of *Spondylus*, deriving from M34: a. Bilobed, tubular and biconvex beads; b. Deformation manner of the perforation; c. Unfinished perforation; d. Broken perforation; e. Usage facet on a biconvex bead.
Podoabe confecționate din *Spondylus*, provenind din M34: a. Perle bilobate, tubulară și biconvexă; b. Maniera de deformare a perforației; c. Perforație nefinalizată; d. Perforație fracturată; e. Fațeta de uzură la o perlă biconvexă.

Fig. 4. Adornments made of *Spondylus*, deriving from M38: a. Bilobed and trilobed pearls; b, c, d. Deformation manner of the perforations.
Podoabe confecționate din *Spondylus*, provenind din M38: a. Perle bilobate și trilobate; b, c, d. Maniera de deformare a perforațiilor.

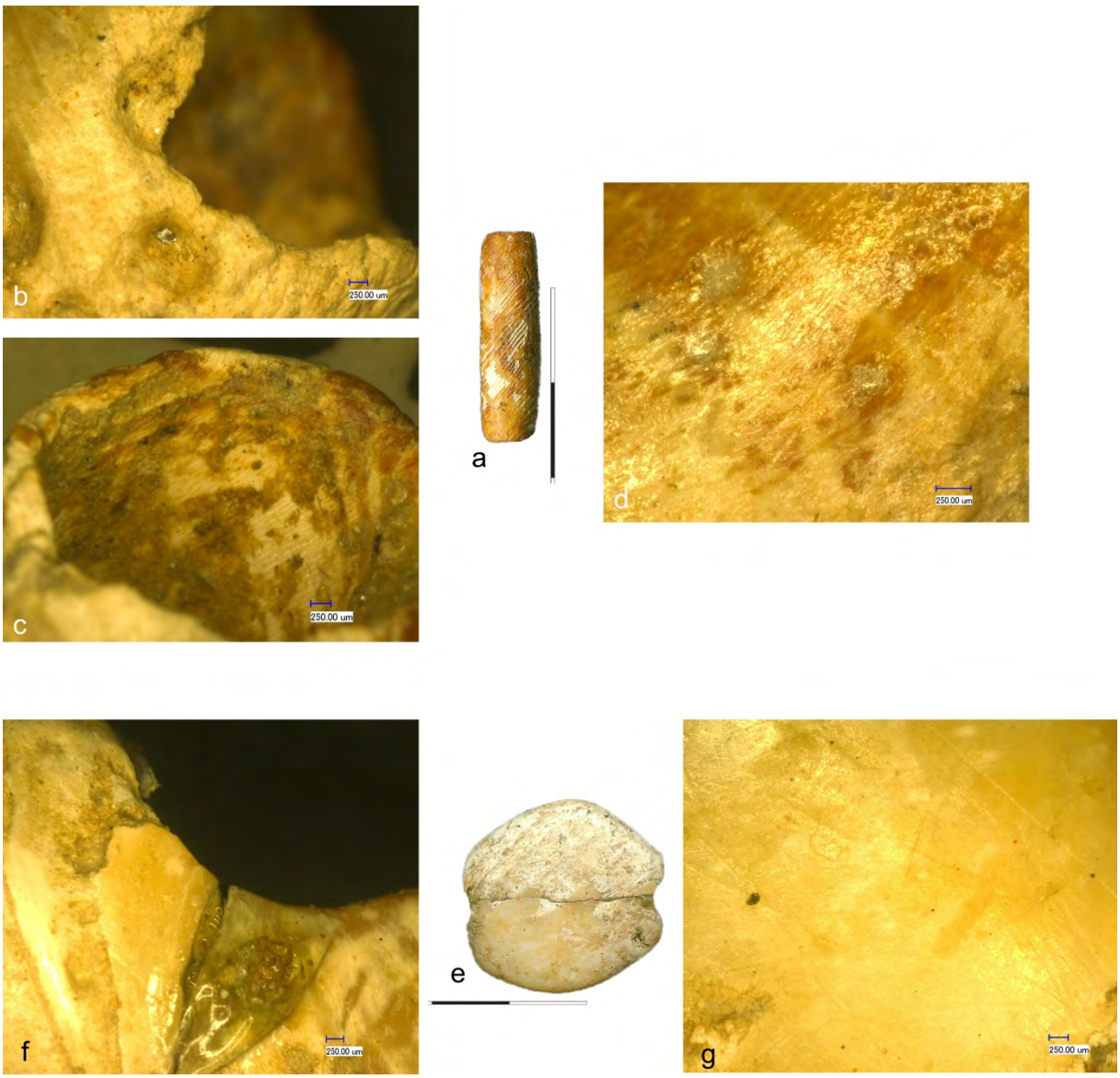

Fig. 5. Adornments made of *Spondylus*, deriving from M186: a. Tubular bead; b, f. Small concave facet; c. Detail of the perforation; d, g. Wear traces; e. Button.
Podoabe confecționate din *Spondylus*, provenind din M186: a. Perlă tubulară; b, f. Fațetă concavă; c. Detaliul perforației; d, g. Stigmate de uzură; e. Nasture.

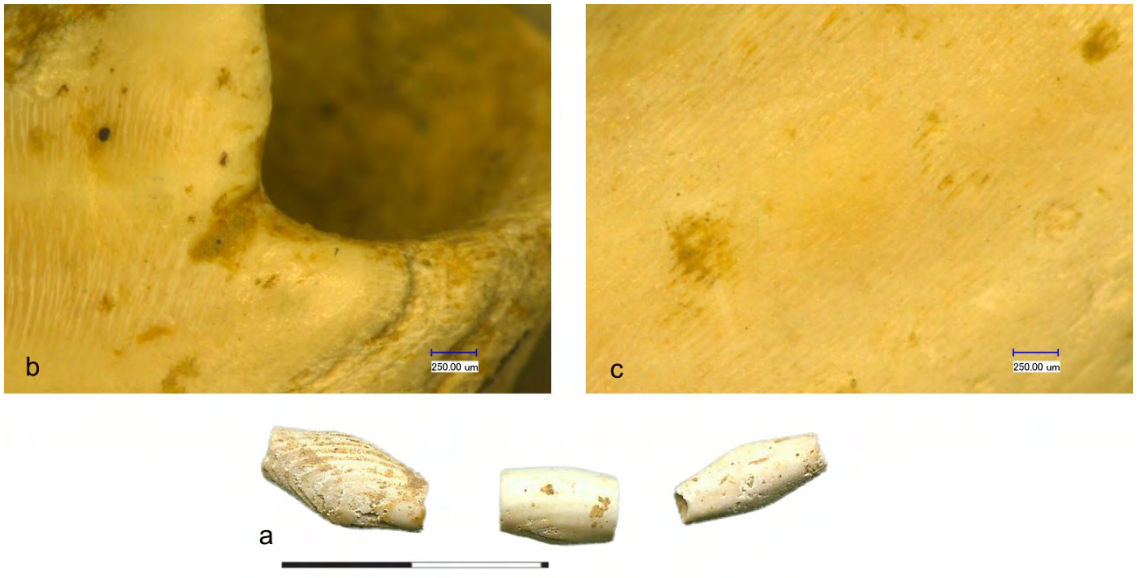

Fig. 6. Adornments made of *Spondylus*, deriving from M111: a. Fusiform and biconvex pearls; b. Concave facet; c. Wear traces in surface.
Podoabe confecționare din *Spondylus*, provenind din M111: a. Perle fusiforme și biconvexă; b. Fațetă concavă; c. Urme de uzură în suprafață.

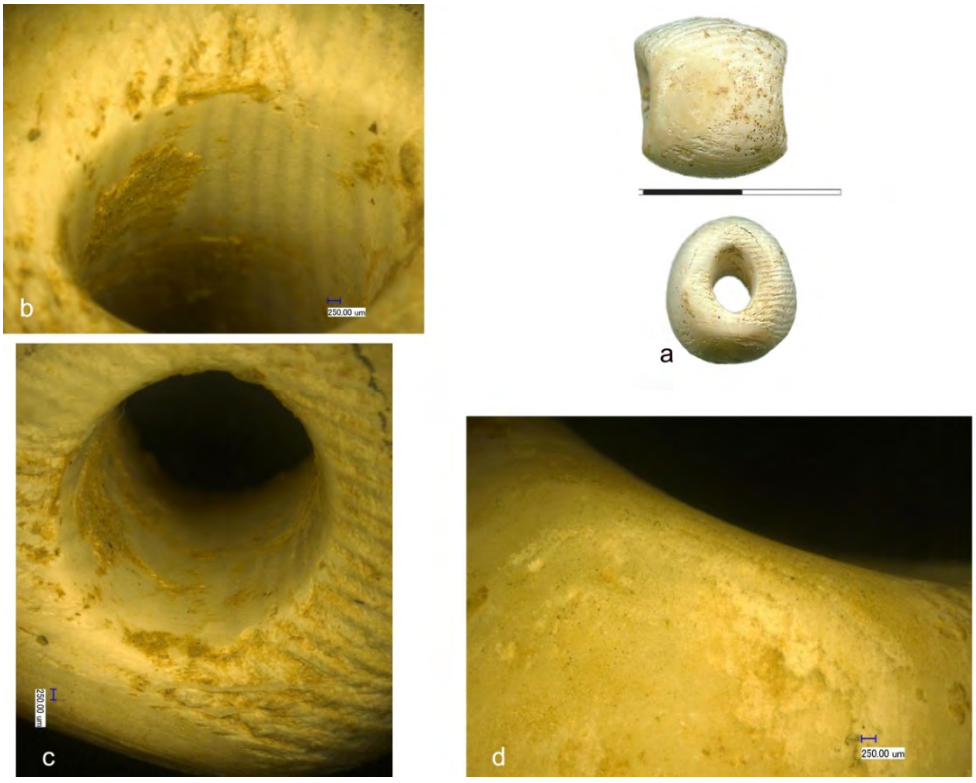

Fig. 7. a. Button, made of *Spondylus*, deriving from M182; b. Detail of the perforation; c, d. Flat usage facet.
a. Nasture confecționat din *Spondylus*, provenind din M182; b. Detaliu al perforației; c, d. Fațeta de uzură.

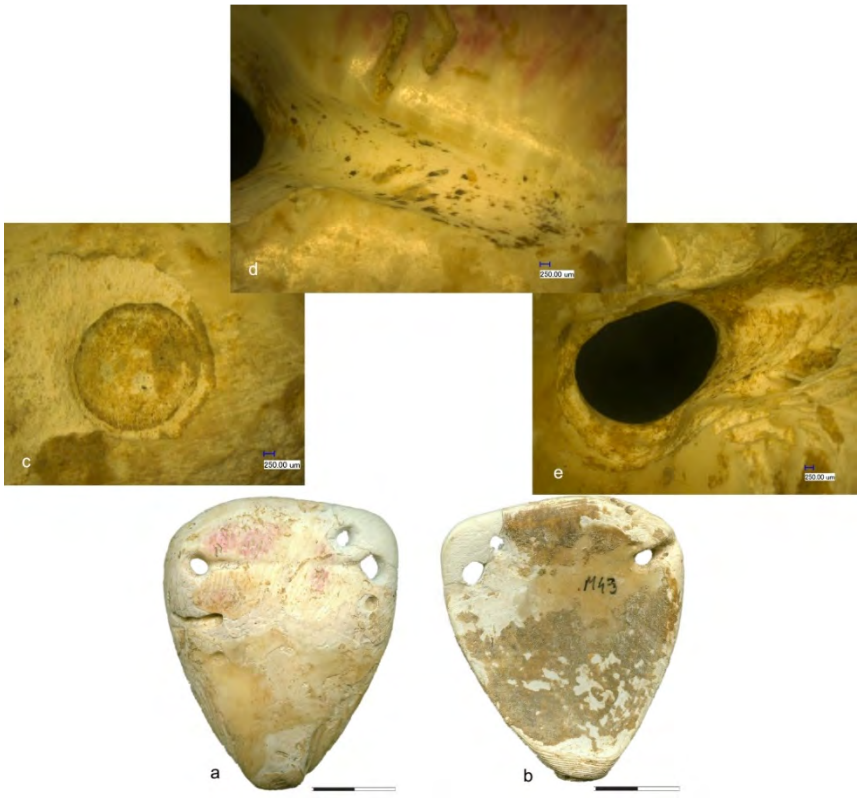

Fig. 8. a, b. Perforated platelet of *Spondylus*, deriving from M43; c. Unfinished perforation; d. Depression developed on the superior side; e. Deformation manner of the perforation.
a, b. Plachetă din *Spondylus*, provenind din M43; c. Perforație nefinalizată; d. Depresiune dezvoltată pe fața superioară; e. Maniera de deformare a perforației.

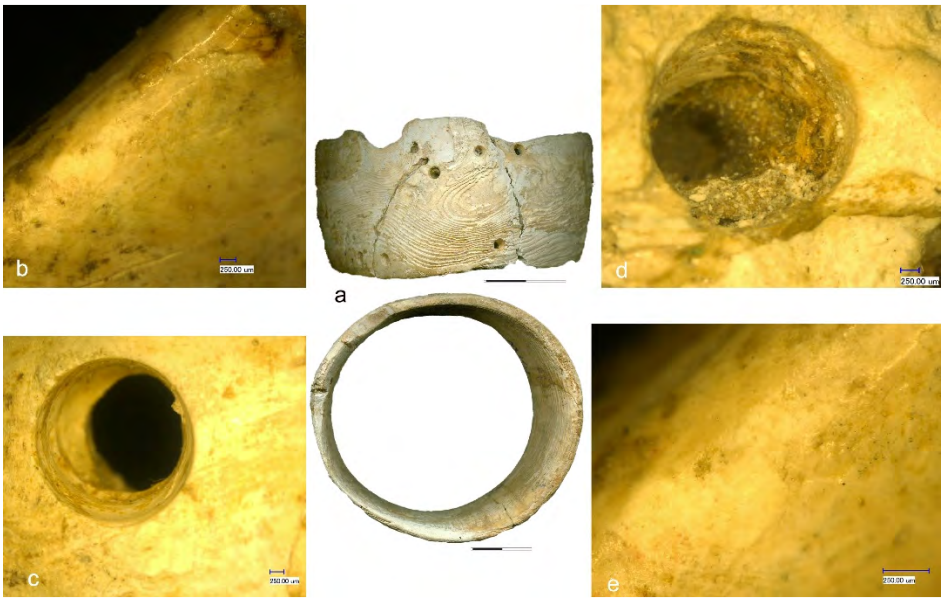

Fig. 9. a. Bracelet of *Spondylus* valve, deriving from M141; b. Edge of the piece; c, d. Detail of the perforations; e. Strong polish of the surface.
a.Brățară din valvă de *Spondylus*, provenind din M141; b. Extremitatea piecei; c, d. Detaliu al perforațiilor; e. Lustru puternic al suprafeței.

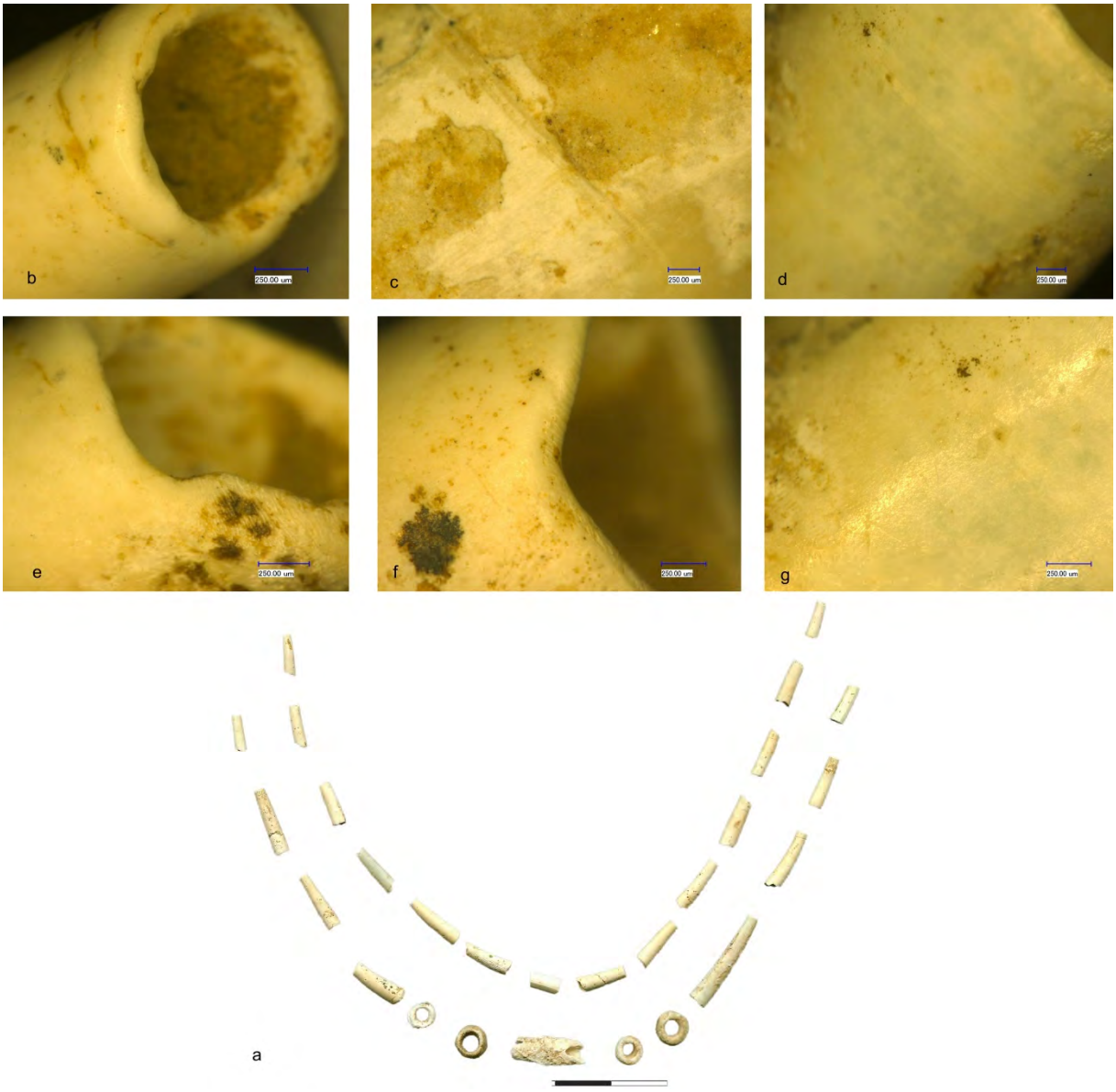

Fig. 10. a. Adornments of *Dentalium* and *Spondylus*, deriving from M101; b, c. Segmentation procedure; d. Shaped surface; e, f. Small concavities at the extremity level; g. Flat usage facet.
a. Podoabe din *Dentalium* și *Spondylus*, provenind din M101; b, c. Procedeu de segmentare; d. Suprafață fasonată; e, f. Mici concavități la nivelul extremității; g. Fațeta de uzură.

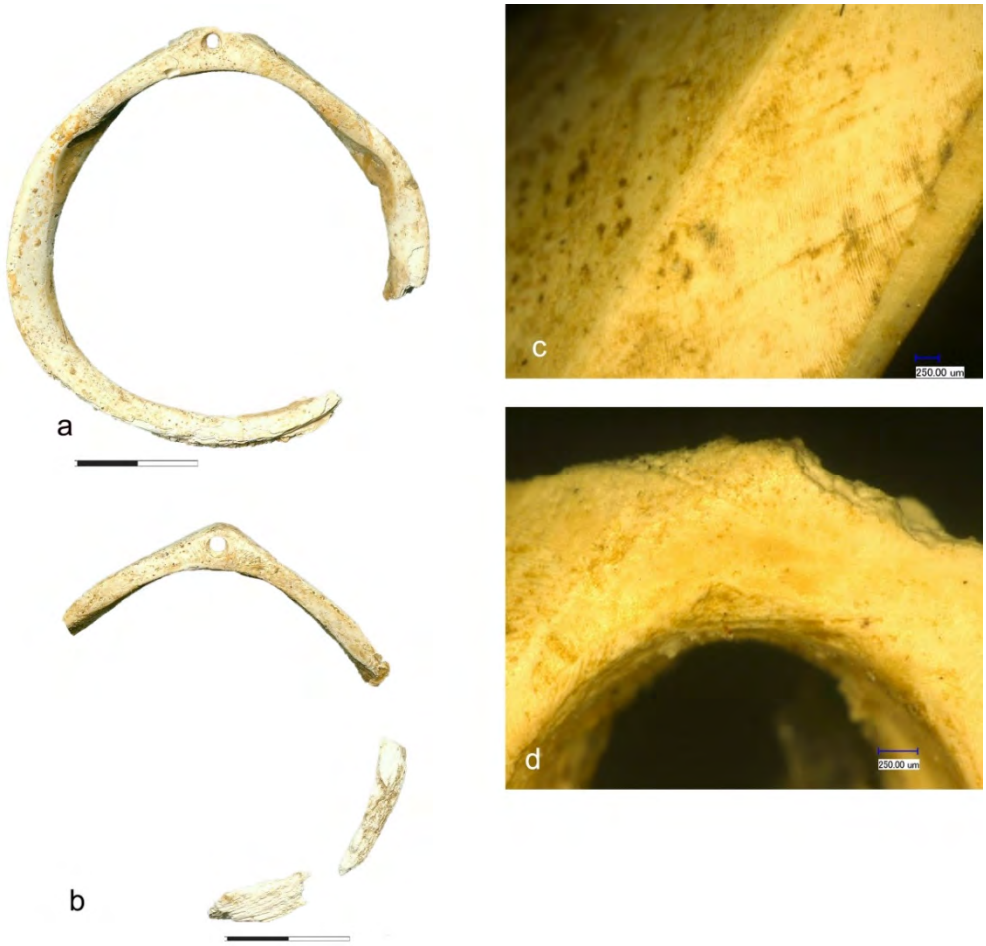

Fig. 11. a, b. Bracelets of *Glycymeris*, deriving from M166A; c. Abrasion plan; d. Usage area.
a, b. Brățări din *Glycymeris*, provenind din M166A; c. Plan de abraziune; d. Aria de uzură.

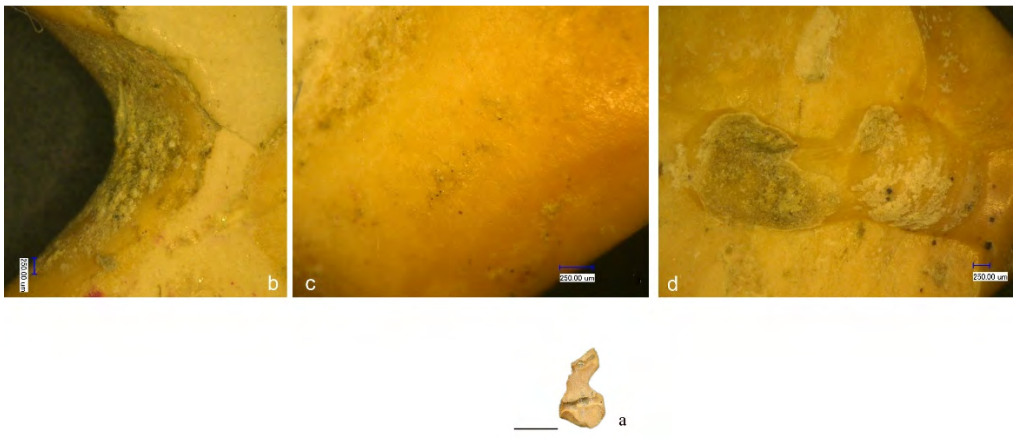

Fig. 12. a. Bilobed pearl of bone, deriving from M9; b. Cutting of the shape bead; c. Abrasion of the surface; d. Broken perforation.
a. Perlă bilobată din os, provenind din M9; b. Tăierea formei podoabei; c. Abraziunea suprafeței; d. Perforație fracturată.

Fig. 13. a. Annular piece of bone, deriving from M37; b, c. Abrasion of the surface; d. Detail of the perforation; e. Polish of the surface.
a. Piesă inelară din os, provenind din M37; b, c. Abraziunea suprafeței; d. Detaliu perforație; e. Lustrul suprafeței.

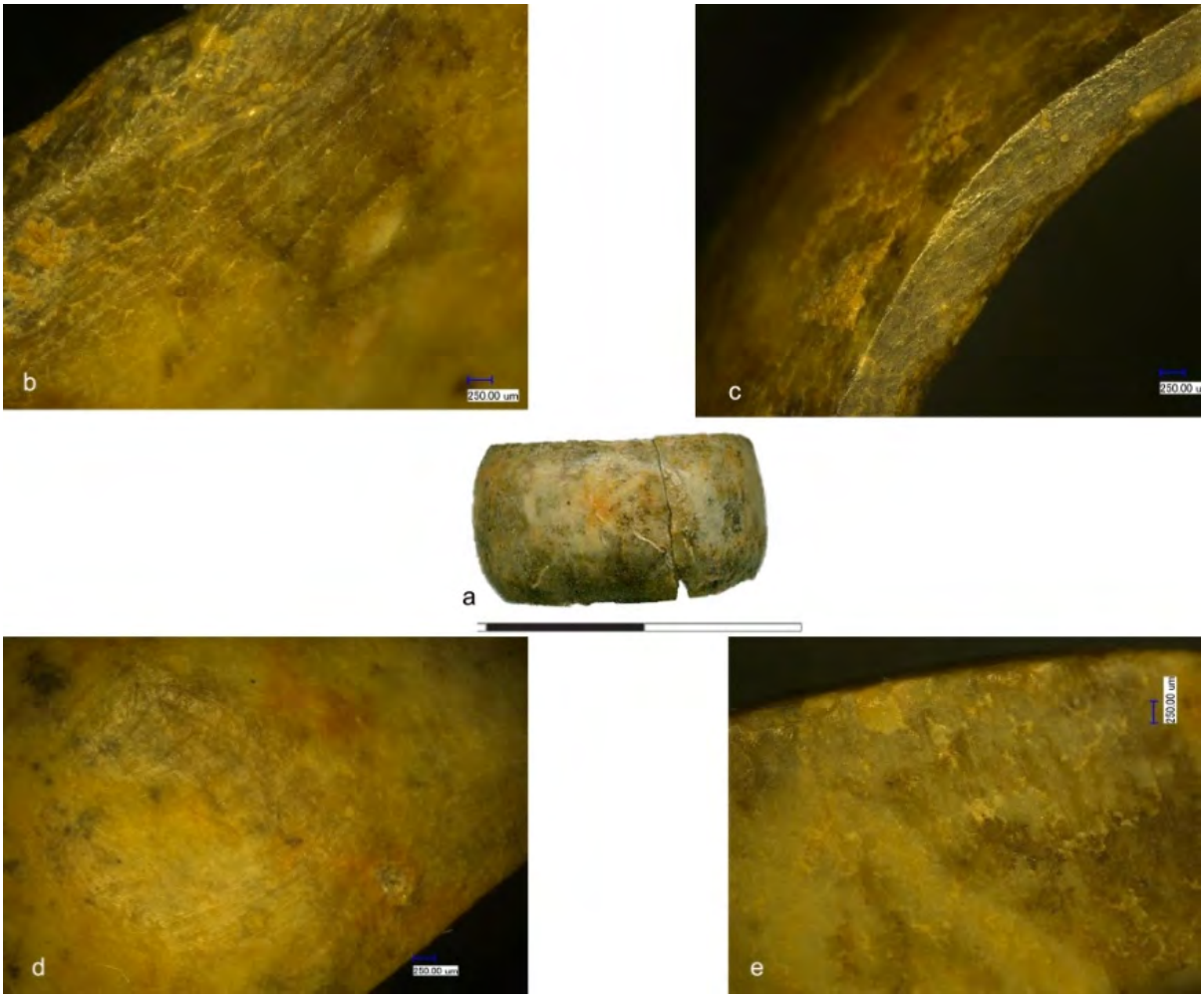

Fig. 14. a. Ring of bone, deriving from M90; b. Procedure of segmentation; c, d. Shaping by abrasion; e. Detail inside the ring.
a. Inel din os, provenind din M90; b. Procedeu de segmentare; c, d. Fasonaj prin abraziune; e. Detaliu din interiorul inelului.

Fig. 15. a. Feminine stylized figurine, made of bone, deriving from M101; b. Sawing Procedure; c. Delineating action; d. Longitudinal scraping; e. Grooving procedure; f. Polishing procedure; g. Surface with wear polish.
a. Figurină feminină stilizată, din os, provenind din M101; b. Procedeu de segmentare; c. Acțiune de demarcare; d. *Raclag*e longitudinal; e. Procedeu de *rainurage*; f. Procedeu de fasonaj; g. Suprafață cu lustru de uzură.

Fig. 16. a. Feminine stylized figurine, made of bone, deriving from M191; b. Shaping by scraping; c. Delineation action; d. Grooving procedure; e. Detail of the extremity.
a. Figurină feminină stilizată, din os, provenind din M191; b. Amenajare prin *raclage*; c. Acțiune de demarcație; c. Procedeu de *rainurage*; e. Detaliul extremității.

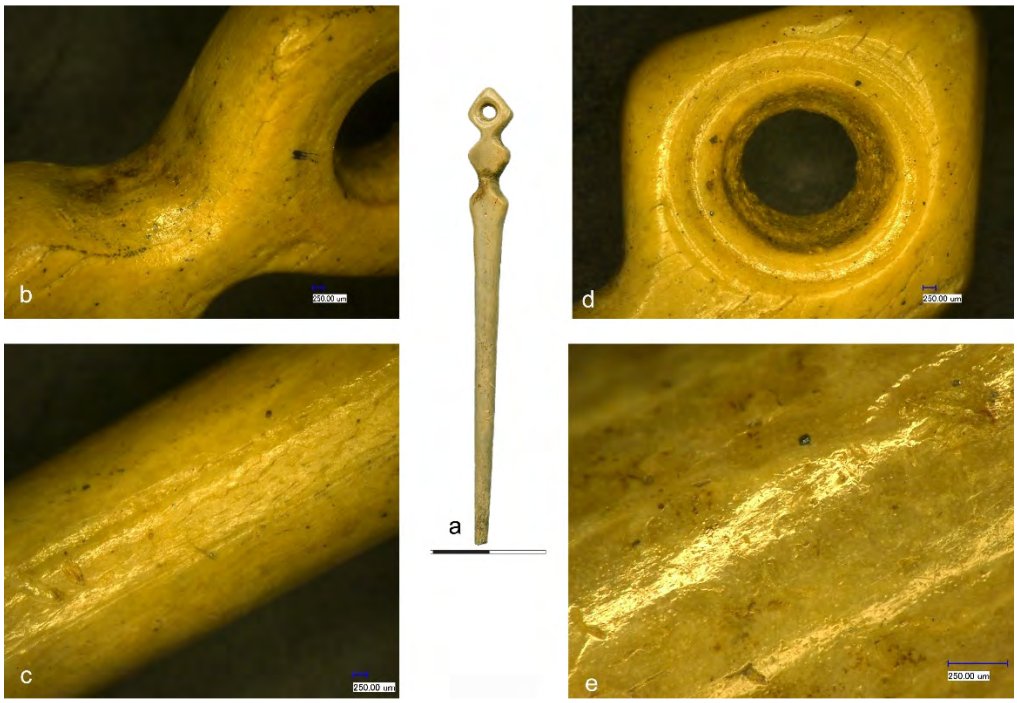

Fig. 17. a. Decorated needle of bone, deriving from M251. b. Sawing procedure; c. Longitudinal scraping; d. Detail of the perforation; e. Surface with strong polish.
a. Ac decorat din os, provenind din M251; b. Procedeu de *sciage*; c. *Raclage* longitudinal; d. Detaliu perforație; e. Suprafață cu lustru puternic.

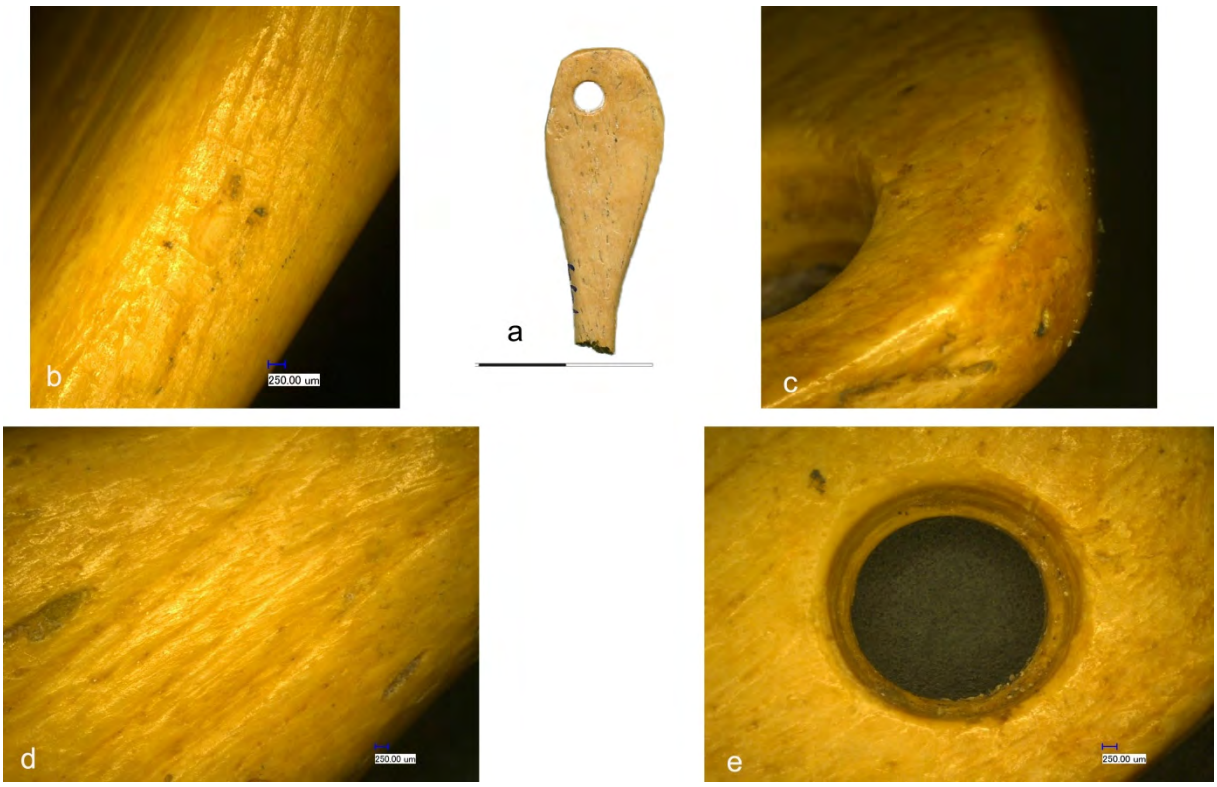

Fig. 18. a. Fragmentary bone piece, deriving from M144; b. Scraping and abrasion procedures; c. Abrasion procedure; d. Scraping procedure; e. Detail of the perforation.
a. Piesă din os fragmentară, provenind din M144; b. Procedee de *raclage* și abraziune; c. Procedeu de abraziune; d. Procedeu de *raclage*; e. Detaliu perforație.

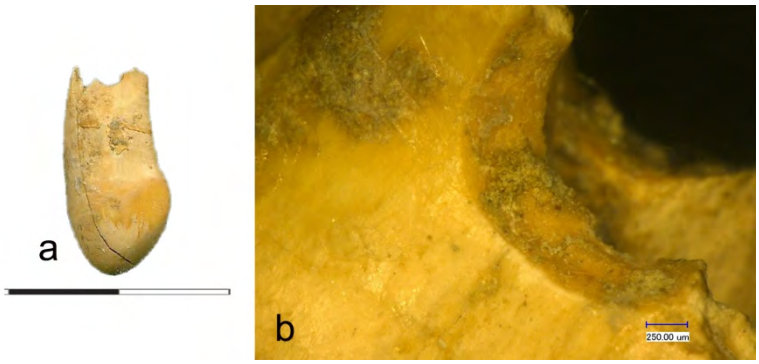

Fig. 19. a. Canine of perforated *Cervus elaphus*, deriving from M38; b. Detail of the perforation.
a. Canin de *Cervus elaphus* perforat, provenind din M38; b. Detaliu perforație.

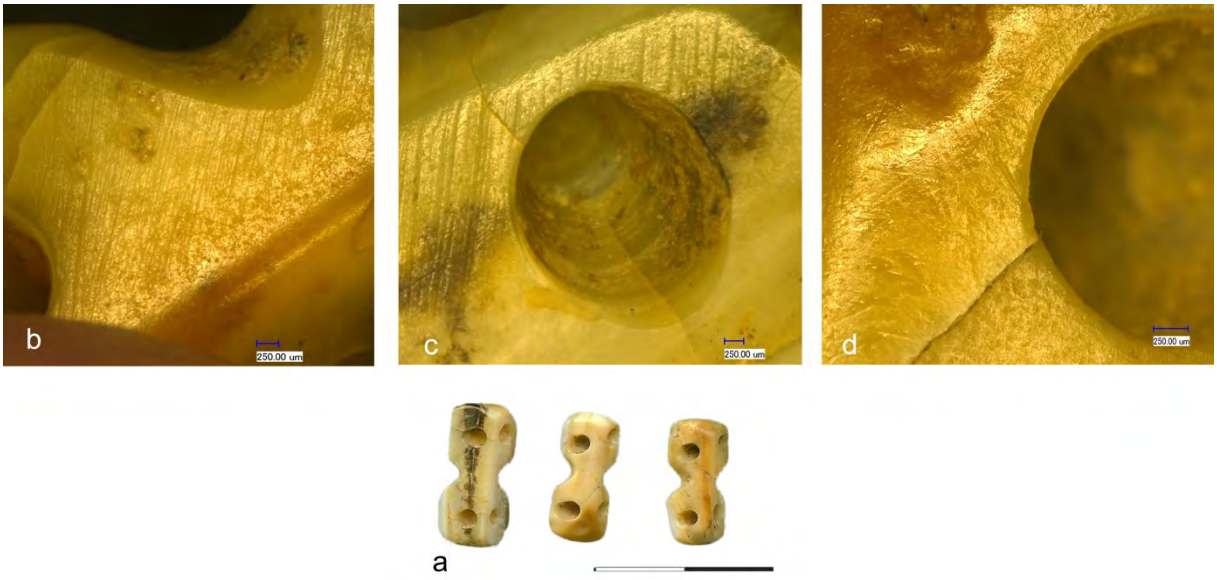

Fig. 20. a. Bilobed pearls of tooth, deriving from M38; b, c. Abrasion procedure; d. Macroscopic polish area.
a. Perle bilobate din dinte, provenind din M38; b, c. Procedeu de abraziune; d. Zona de lustru macroscopic.

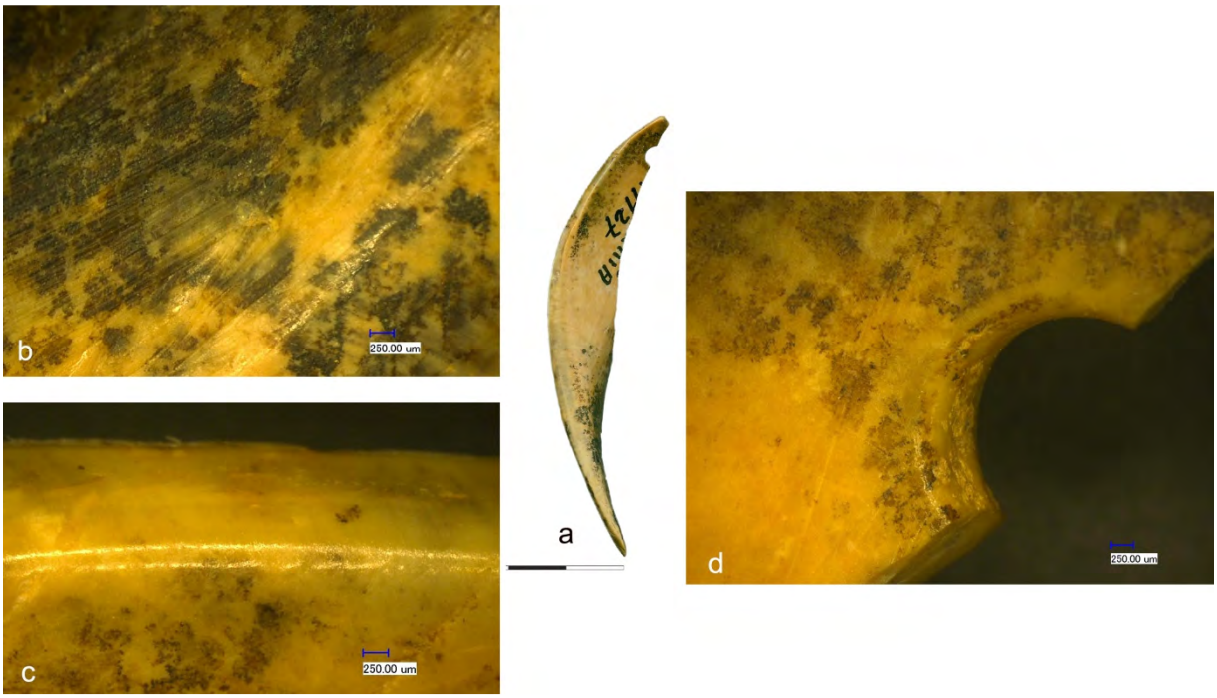

Fig. 21. a. Pendant of *Sus* sp. canine, deriving from M127; b. Scraping procedure; c. Abrasion of the debitage edges; d. Detail of the perforation.
a. Pandantiv din canin de *Sus* sp., provenind din M127; b. Procedeu de *raclage*; c. Abraziunea laturilor de debitaj; d. Detaliu perforație.

Notă asupra unor capace de lut cu trăsături umane de la Şoimuş-*La Avicola (Ferma 2)*, jud. Hunedoara

Cristian Eduard ŞTEFAN*
Radu PETCU**

Abstract: *In this article, the authors present five clay lids with human traits discovered at Şoimuş-La Avicola (Ferma 2), Hunedoara County. The contexts of their discovery belong to Turdaş tradition being revealed on the occasion of some rescue excavations made on the A1 Motorway, Deva-Orăştie sector. Beside these clay lids other artifacts with human traits were also discovered in this settlement, such as anthropomorphic representations on pottery, clay "altars", anthropomorphic vessels and clay figurines. Interesting fact is that human representations depicted on those kind of artifacts mentioned before are very similar one to another.*

Rezumat: *În acest articol autorii prezintă cinci capace de lut cu trăsături umane descoperite la Şoimuş-La Avicola (Ferma 2), jud. Hunedoara. Contextele descoperirii lor aparţin tradiţiei de tip Turdaş fiind dezvelite cu ocazia unor săpături arheologice preventive făcute pe traseul Autostrăzii A1, sectorul Deva-Orăştie. În afara acestor capace de lut şi alte artefacte cu trăsături umane au fost descoperite în această aşezare, cum ar fi reprezentările antropomorfe de pe ceramică, „altare" de lut, vase antropomorfe şi figurine de lut. Un fapt interesant este similaritatea dintre aceste tipuri de reprezentări de pe artefactele menţionate mai sus.*

Keywords: *Chalcolithic, Turdaş, clay lids, Şoimuş, pottery.*

Cuvinte cheie: *eneolitic, Turdaş, capace de lut, Şoimuş, ceramică.*

◈ Introducere

În perioada 16 august – 16 noiembrie 2011, o echipă formată din specialişti de la Institutul de Arheologie „Vasile Pârvan" din Bucureşti, Muzeul Civilizaţiei Dacice şi Romane din Deva şi Muzeul Naţional de Istorie a României, a desfăşurat cercetări arheologice preventive pe traseul viitoarei autostrăzi A1, segmentul Deva – Orăştie. În punctul *La Avicola (Ferma 2)* a fost cercetată o parte dintr-un complex de aşezări, fiind dezvelite aproximativ 700 de complexe arheologice databile în perioadele neolitic, epoca bronzului, epoca romană, post-romană şi medievală timpurie (R. Petcu *et alii* 2012; C.E. Ştefan *et alii* 2013, p. 49–50; C.E. Ştefan 2014, p. 14–22). Aşezarea neolitică este poziţionată în imediata apropiere a râului Mureş (pl. I/1-2) şi cuprinde două faze principale de locuire: o primă fază corespunde unei aşezări constituite din bordeie, apoi se constată o nivelare a terenului cu un sediment brun cenuşos, urmat de a doua fază de locuire, care corespunde resturilor unor locuinţe de suprafaţă. Analiza primară a materialului arheologic a dus la concluzia că aşezarea neolitică aparţine stilului ceramic Turdaş (C.E. Ştefan *et alii* 2013, p. 52–53, în concordanţă cu mai vechile opinii: F. Draşovean, M. Rotea 1986, p. 21–22; S.A. Luca 1997, p. 70; S.A. Luca 2008, p. 165, nr. cat. 406).

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◈ Piese şi contexte

1) Capac prosopomorf, de culoare cărămiziu deschis, pastă semifină, degresantul folosit fiind nisipul, descoperit în stare fragmentară. Sunt figuraţi ochii prin două incizii clare, orizontale, nasul printr-o proeminenţă semicirculară şi sprâncenele printr-o uşoară prelungire a părţii superioare a capacului (pl. II/2a-c). Decorul păstrat constă din benzi laterale cu câte şase rânduri de incizii în pasta moale. Acesta a fost descoperit în **Complexul 239**, în martorul central. **C. 239** reprezintă un şanţ cu lungimea de 54 m, lăţimea maximă de 4,1 m şi o adâncime maximă de 2,2 m. Şanţul conţinea fragmente de chirpici, ceramică, fragmente de figurine antropomorfe, greutăţi de lut, piese din silex şi obsidian, o râşniţă, oase umane, oase de animale, piese din os şi corn, vase miniaturale. Era orientat NE-SV şi a avut trei refaceri în perioada de utilizare. Probabil funcţia sa iniţială a fost probabil aceea de scurgere a apei, fiind folosit ulterior şi ca mijloc de delimitare a unor locuinţe sau gospodării sau ca arie de activitate pentru diverse ocupaţii cotidiene (pl. II/1).

2) Capac cu reprezentare antropomorfă în relief, de culoare cărămiziu închis, pastă semifină, degresantul folosit fiind nisipul, descoperit în stare fragmentară. În partea superioară este figurată o faţă umană în relief, de formă triunghiulară, cu ochii şi nasul clar reliefaţi. Decorul constă din benzi laterale, verticale, incizate în pasta moale umplute la rândul lor cu incizii (pl. II/3a-3b). Capacul a fost descoperit în **Complexul 239**, la adâncimea de 0,25 m.

3) Capac cu reprezentări antropomorfe în relief, simetrice, de tip Janus, de culoare cenuşie, pastă semifină, ca degresant fiind folosit nisipul. Piesa a fost descoperită în stare fragmentară, având figurate în partea superioară două feţe umane, de formă triunghiulară, cu nasul, ochii şi gura clar reliefate, cu două perforaţii în partea superioară. Decorul constă din benzi incizate, unele triunghiulare, dispuse pe corpul vasului, umplute la rândul lor cu alte incizii orizontale, dar şi alte incizii grupate într-un decor de tip „spic de grâu". Unele dintre incizii sunt umplute cu vopsea de culoare roşie (pl. III/2a-c). Piesa a fost descoperită în **Complexul 270**, la adâncimea de 0,50-0,60 m. **C. 270** reprezintă o structură cu lungimea de 6,9 m, lăţimea de 4,4 m şi adâncimea de 1,3 m (cel mai probabil o locuinţă semi-îngropată, care apoi a fost dezafectată şi umplută cu ceramică fragmentară, figurine antropomorfe, chirpici, silex, oase umane, oase de animale prelucrate şi neprelucrate, piese de corn, cochilii, unelte din piatră şlefuită, un disc de lut şi strecuratoare fragmentară). **C. 270** a fost umplut sistematic, fără lentile de depuneri naturale. Oasele umane erau reprezentate de un fragment de calotă craniană şi de o mandibulă ruptă în două, fără a se putea preciza dacă provin sau nu de la acelaşi individ. Complexul prezintă mai multe alveolări şi trepte pe laturile nordică şi sudică (pl. III/1).

4) Capac prospomorf, de culoare cenuşie, pastă semifină, ca degresant fiind folosit nisipul. Piesa este în stare fragmentară, nasul, ochii şi urechile fiind bine reliefate; prezintă două perforaţii în partea superioară, iar decorul constă din benzi laterale incizate în pasta moale (pl. IV/2a-c). Capacul a fost descoperit în **Complexul 444B**, care reprezintă o groapă din a cărei umplutură au fost recuperate fragmente ceramice, plastică antropomorfă, chirpici, fragmente de vatră, silex, obsidian, o

râşniţă, un percutor, oase de animale prelucrate şi neprelucrate, obiecte din corn, cochilii. Diametrul gropii era de circa 2 m, iar adâncimea maximă de 2,8 m, fiind situată în imediata proximitate a **Complexului 444A**. În interiorul **C. 444B** au fost observate depuneri multiple de sedimente de culoare brun, cafeniu şi galben (pl. IV/1).

5) Capac prosopomorf, de culoare cenuşie, pastă semifină, ca degresant fiind folosit nisipul. Piesa este în stare fragmentară, nasul şi ochii fiind bine reliefate. Decorul constă într-o serie de benzi incizate în pasta moale a piesei, umplute la rândul lor cu incizii succesive (pl. V/1a-c). Capacul a fost descoperit în stratul arheologic, la o adâncime de 0,30-0,40 m.

◈ Analogii şi discuţii

Piese asemănătoare au fost descoperite şi în alte aşezări turdăşene, cum ar fi cea de la Turdaş-*Luncă* (M. von Roska 1941, p. 248-249, Taf. CII, CIII) sau vinčiene, precum cele de la Hodoni, Liubcova sau Parţa, ca să dăm numai câteva exemple (C.E. Ştefan 2014, 21).

Interesant ni se pare faptul că în cadrul aceleiaşi aşezări, în cazul nostru situl turdăşean de la Şoimuş-*La Avicola (Ferma 2)*, avem mai multe forme de reprezentare a corpului uman. Aici avem de a face cu vase antropomorfe (C.E. Ştefan 2014, p. 15-16, fig. 3, 4), cu reprezentări antropomorfe pe vase (C.E. Ştefan *et alii* 2013, p. 49-66) şi piesa prezentată de noi în acest articol (pl. II/3a-3b), "altare" cu caracteristici umane (C.E. Ştefan 2014, p. 16-18, fig. 6, 10) şi figurine antropomorfe, care urmează să fie analizate într-un studiu separat în viitorul apropiat. Surprinzătoare sunt unele trăsături comune prezente în toate aceste forme de reprezentare antropomorfă enumerate mai sus, cum ar fi: forma mai mult sau mai puţin triunghiulară a capului şi absenţa unor caracteristici ale feţei (ambele putând sugera măşti), aspectul general al corpului, unele elemente de decor.

Importantă este şi prezenţa pigmentului de culoare roşie pe piesa de la pl. III/2a-c, care ne duce cu gândul la analogia vas-corp uman, discutată în literatura de specialitate (G. Naumov 2008, p. 93-101; Al. Dragoman 2009, p. 95-112). Pentru vasele Vădastra s-a sugerat că această culoare roşie ar reprezenta sângele, iar culoarea albă incrustată oasele unui corp uman (Al. Dragoman 2009, p. 101). În acest context merită menţionat faptul că pictura cu alb şi/sau roşu este prezentă de asemenea şi pe unele dintre figurinele antropomorfe de la Şoimuş-*La Avicola (Ferma 2)*. În aceeaşi notă, se poate remarca din descrierile făcute pieselor şi contextelor de mai sus, că avem cel puţin două situaţii în care este atestată prezenţa oaselor umane în contextele respective: **C. 239** şi **C. 270**. Prezenţa oaselor umane în astfel de contexte ne-ar putea duce cu gândul la separarea gropilor în două categorii: „rituale" şi „domestice", însă aşa cum bine au observat unii autori nu este întotdeauna cazul să facem o asemnea separare. Oasele umane puteau fi artefacte în sine sau puteau fi privite ca având o importanţă secundară în legătura cu "înmormântarea" altui artefact (J. Thomas 1999, p. 68). Aici ni se pare important de subliniat un fapt care vine să întărească ideea anterioară, şi anume că gropile cu oase umane si cele fără oase umane de la Şoimuş nu diferă substanţial în termeni de structură a depunerilor (vezi *infra* – descrierea complexelor). De asemenea, oase umane au fost descoperite şi în contexte aparţinând altor culturi, cum ar fi vertebrele din *Groapa i* de la Vădastra (Al. Dragoman 2013, p. 115). Un studiu relativ recent repune în discuţie conceptul de „depunere structurată" apărut în arheologia britanică la mijlocul anilor '80 ai secolului trecut şi preluat apoi de numeroşi specialişti ai domeniului, arătând, printre altele, că fără a

exista o anume intenţionalitate a gestului în depunerile de artefacte din gropi, analiza acestora ne poate spune foarte multe lucruri despre societăţile arhaice respective (D. Garrow 2012, p. 85-115).

După J. Chapman, umplerea unei gropi este o metaforă, reîncorporarea unui material actual într-un context definit prin depuneri mai timpurii. În aşezări, săparea gropilor poate fi văzută ca mediind un schimb cu strămoşii, noul material pentru cel vechi, atunci când gropile sunt săpate în niveluri mai timpurii (J. Chapman 2000, p. 64-65).

În termenii tipurilor de decor avem benzile incizate tipice culturii Turdaş, prezente şi pe alte tipuri de recipiente la Şoimuş-*La Avicola (Ferma 2)* (C.E. Ştefan *et alii* 2013, p. 65, pl. XI/fig. 3; p. 66, pl. XII/fig. 2, 4), Turdaş-*Luncă* (S.A. Luca 2001, fig. 25/7; 30/10; 42/8) sau Orăştie-*Dealul Pemilor (punct X2)* (S.A. Luca 1997, pl. XI/12; XII/5; XIV/2, 6, 8-16; XX/16; XXIII/1, 2; XXV/3-7; XXIX/9). Pe de altă parte, prezenţa perforaţiilor în partea superioară a unora dintre capacele prezentate de noi ne dă unele indicii cu privire la faptul că erau şi piese funcţionale, nu numai obiecte folosite în cadrul unor anumite ceremonii. Probabil aceste două funcţii coexistau, neexistând o separaţie în mentalul oamenilor preistorici.

Demnă de atenţie este şi ideea că unele recipiente rămân active şi după ce sunt deteriorate parţial sau total, aşa cum o atestă exemplele etnografice. Ele pot fi utilizate în alte scopuri decât cele iniţiale, ca parte integrantă a gesturilor respectivei colectivităţi umane (Al. Dragoman 2013, p. 116, 118).

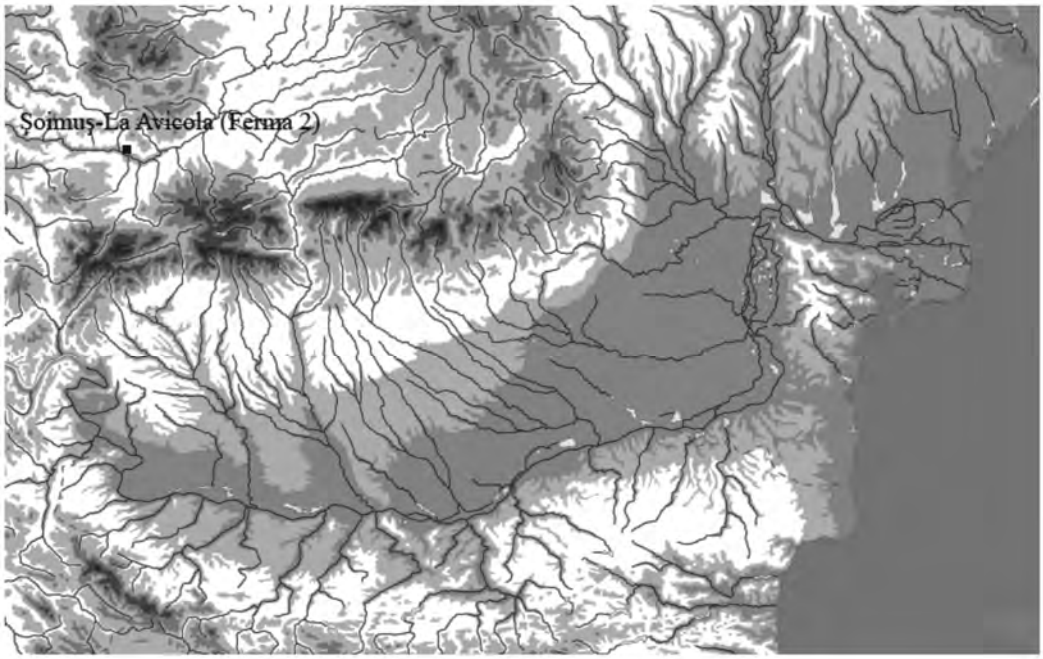
Capace prospomorfe sau vase cu caracteristici umane au fost descoperite şi în alte arii culturale, cum ar fi Hamangia (V. Voinea, G. Neagu 2006, p. 154, pl. II/fig. 4), Vădastra (Al. Dragoman 2013, fig. 5.2, 5.6) sau Stoicani-Aldeni (I.T. Dragomir 1983, p. 83-84, fig. 45/7). Se pare că există o „modă" în prima jumătate a mileniului V BC în producerea şi propagarea mai ales a capacelor prosopomorfe, „modă" care continuă către finalul mileniului V, astfel de piese fiind prezente şi în cadrul complexului cultural Gumelniţa-Karanovo VI (R.R. Andreescu 2002, p. 72-85, pl. 60-62 şi pl. VI-VII; V. Voinea 2005, p. 63-65, pl. 105-114).

După cum se ştie, în literatura de specialitate există diverse interpretări în ceea ce priveşte funcţia capacelor şi mai larg a vaselor cu trăsături antropomorfe, de la reprezentări ale divinităţilor până la mijloace de „comunicare" cu strămoşii. Acestea apar în contexte diverse (locuinţe, gropi, morminte, niveluri arheologice) din diferite medii culturale, unii specialişti opinând că nu vom putea niciodată să le descifrăm adevărata funcţie (S. Vitezović 2009).

◈ Bibliografie

R.R. Andreescu 2002	*Plastica antropomorfă gumelniţeană. Analiză primară*, Muzeul Naţional de Istorie a României, Bucureşti.
J. Chapman 2000	Pit-digging and Structured Deposition in the Neolithic and Copper Age, *Proceedings of Prehistoric Society*, 66, p. 61-87.
Al. Dragoman 2009	Note on Vădastra excised pots, *SP*, 6, p. 95-112.
Al. Dragoman 2013	*O biografie a ceramicii neolitice de la Vădastra*, Ed. Academiei, Bucureşti.

I.T. Dragomir 1983	*Eneoliticul din sud-estul României. Aspectul cultural Stoicani-Aldeni*, Ed. Academiei R.S.R, Bucureşti.
Fl. Draşovean, M. Rotea 1986	Aşezarea neolitică de la Şoimuş. Contribuţii la problemele neoliticului târziu din sud-vestul Transilvaniei, *Apulum*, XXIII, p. 9-24.
D. Garrow 2012	Odd deposits and average practice. A critical history of the concept of structured deposition, *AD*, 19, 2, p. 85-115.
S.A. Luca 1997	*Aşezări neolitice pe Valea Mureşului (I). Habitatul turdăşean de la Orăştie–Dealul Pemilor (punct X2)*, Bibliotheca Musei Apulensis IV, Alba Iulia.
S.A. Luca 2001	*Aşezări neolitice pe Valea Mureşului (II). Noi cercetări arheologice la Turdaş-Luncă*, Bibliotheca Musei Apulensis XVII, Alba Iulia.
S.A. Luca 2008	*Repertoriul arheologic al judeţului Hunedoara*, Bibliotheca Brukenthal XXVI, Sibiu.
G. Naumov 2008	*The vessel as human body: neolithic anthropomorphic vessels and their reflection in later periods*, în I. Berg (ed.), *Breaking the Mould: Challenging the Past through Pottery*, BAR (IS), 1861, p. 93-101.
R. Petcu *et alii* 2012	R. Petcu, Răz. Petcu, A. Heroiu, Şoimuş 1 (La Avicola), km. 29+750 – 30+300, *Cronica Campania 2011*, p. 291–292.
M. von Roska 1941	*Die Sammlung Zsófia von Torma in der numismatisch-archaeologischen Abteilung des siebenbürgischen Nationalmuseums*, Cluj Napoca.
C.E. Ştefan *et alii* 2013	C.E. Ştefan, R. Petcu, Răz. Petcu, *Reprezentări antropomorfe din aşezarea neolitică de la Şoimuş – La Avicola (Ferma 2), jud. Hunedoara*, *SP*, 10, p. 49–66.
C.E. Ştefan 2014	Some special clay artifacts from Şoimuş – La Avicola (Ferma 2), Hunedoara County, Romania, *The Old Potter's Almanack* 19, 2, p. 14–22.
J. Thomas 1999	*Understanding the Neolithic*, Routledge, London and New York.
S. Vitezović 2009	Pots with faces: prosopomorphic lids in Vinča culture, *Conference held at the 15th Annual Meeting of the European Association of Archaeologists (Abstract)*, Riva del Garda.
V. Voinea 2005	*Ceramica complexului cultural Gumelniţa-Karanovo VI. Fazele A1 şi A2*, Ed. Ex Ponto, Constanţa.
V. Voinea, G. Neagu 2006	*Începutul eneoliticului în Dobrogea: între prejudecăţi şi certitudini*, *SP*, 3, p. 149-161.



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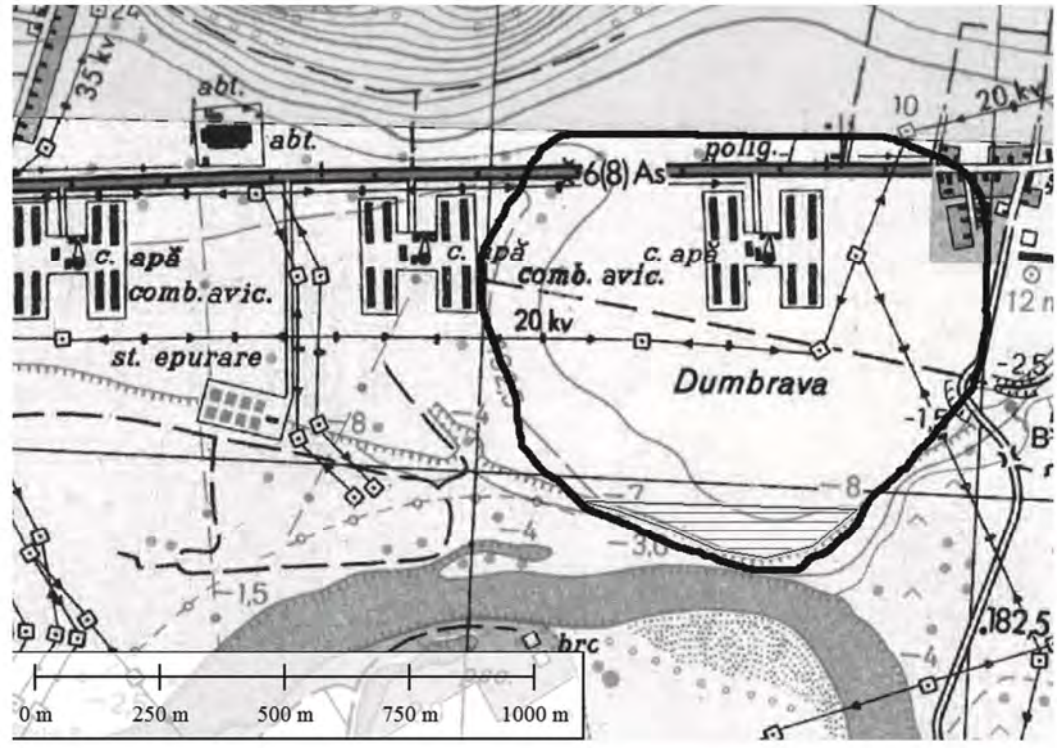

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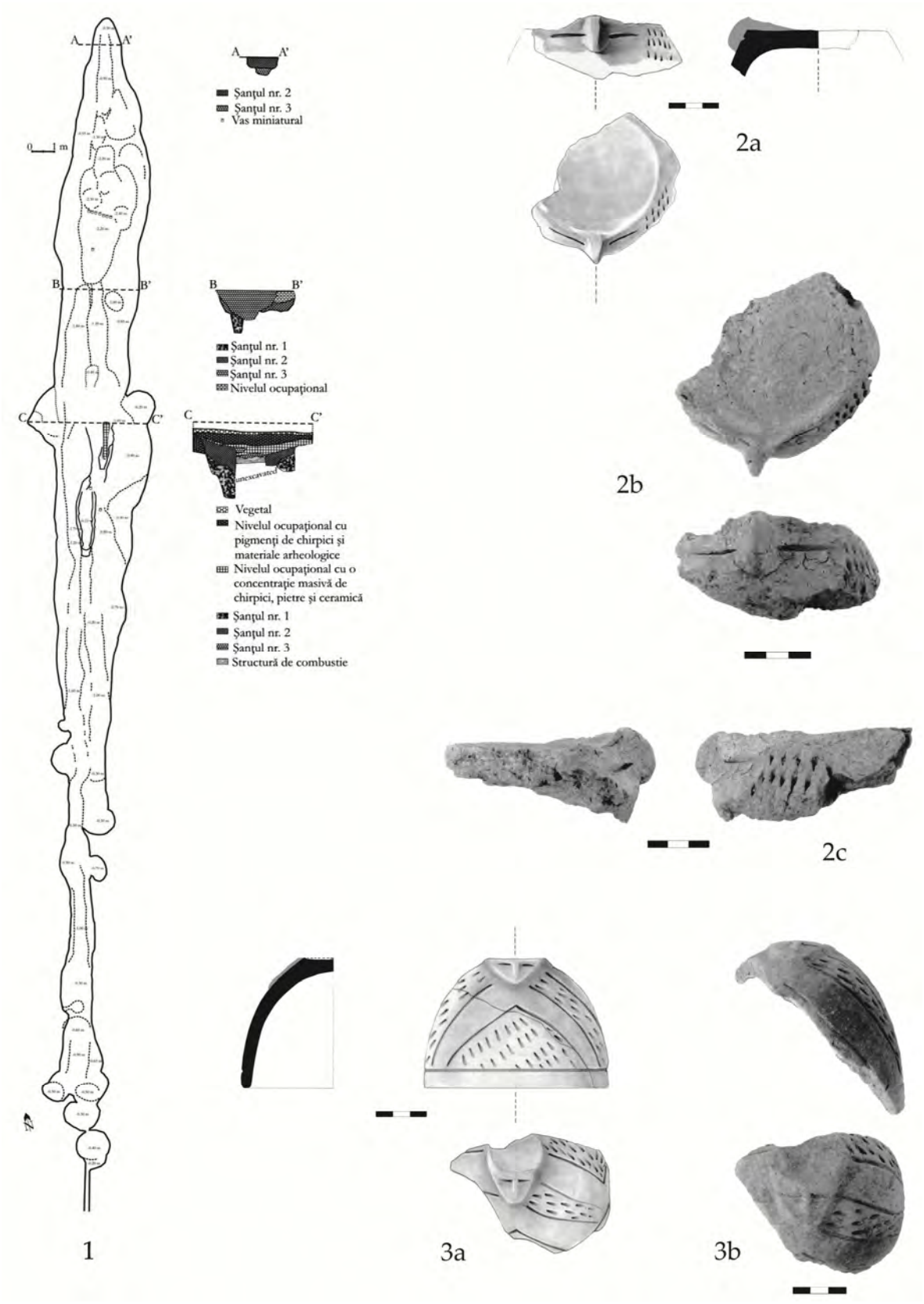
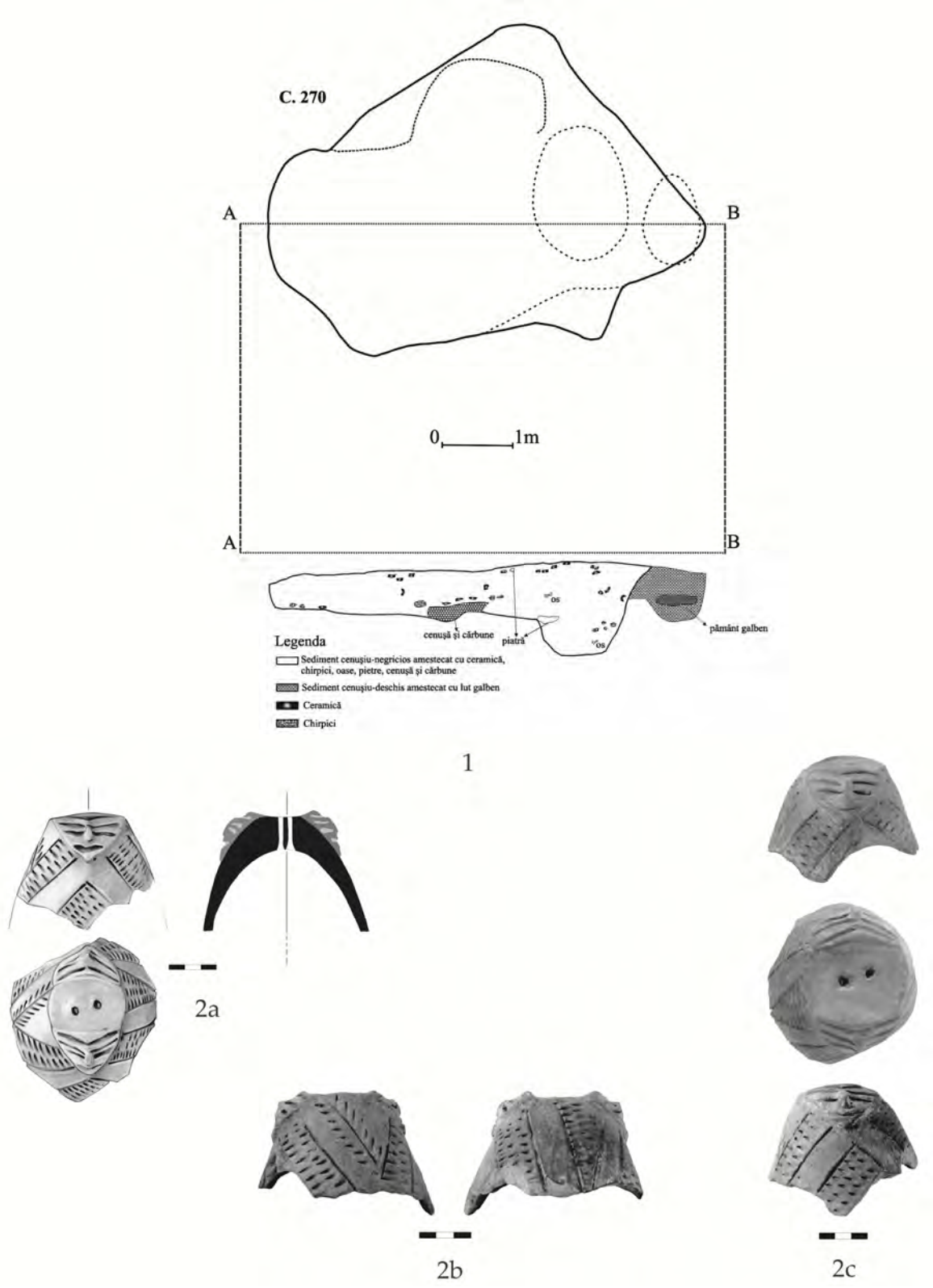
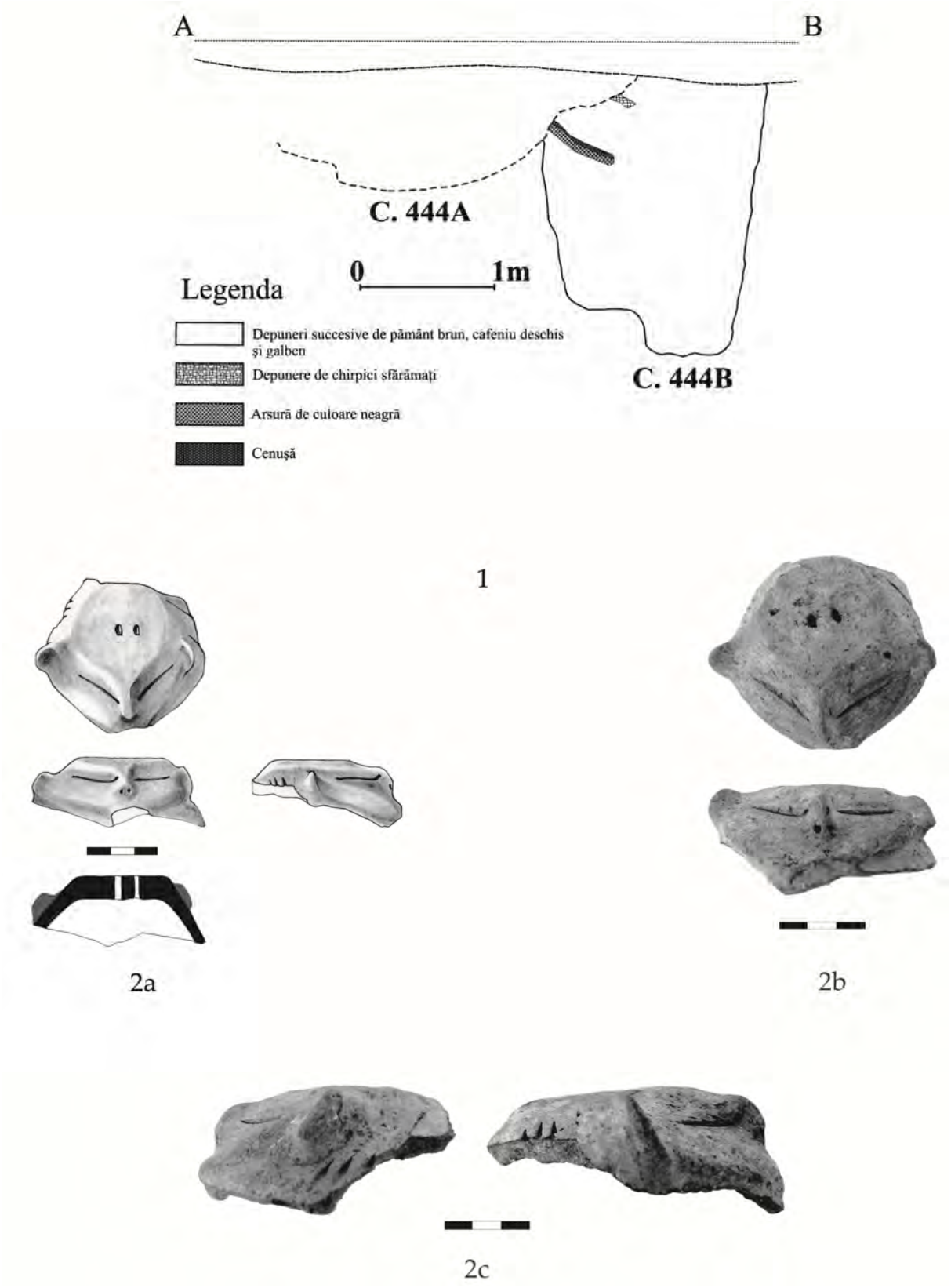
Pl. I. 1. Poziţia pe hartă a aşezării de la Şoimuş-*La Avicola (Ferma 2)*, jud. Hunedoara; 2. Poziţia topografică a aşezării de la Şoimuş-*La Avicola (Ferma 2)*, jud. Hunedoara.
1. The position on map of the settlement from Şoimuş-*La Avicola (Ferma 2)*, Hunedoara County; 2. The topographic position of the settlement from Şoimuş-*La Avicola (Ferma 2)*, Hunedoara County.



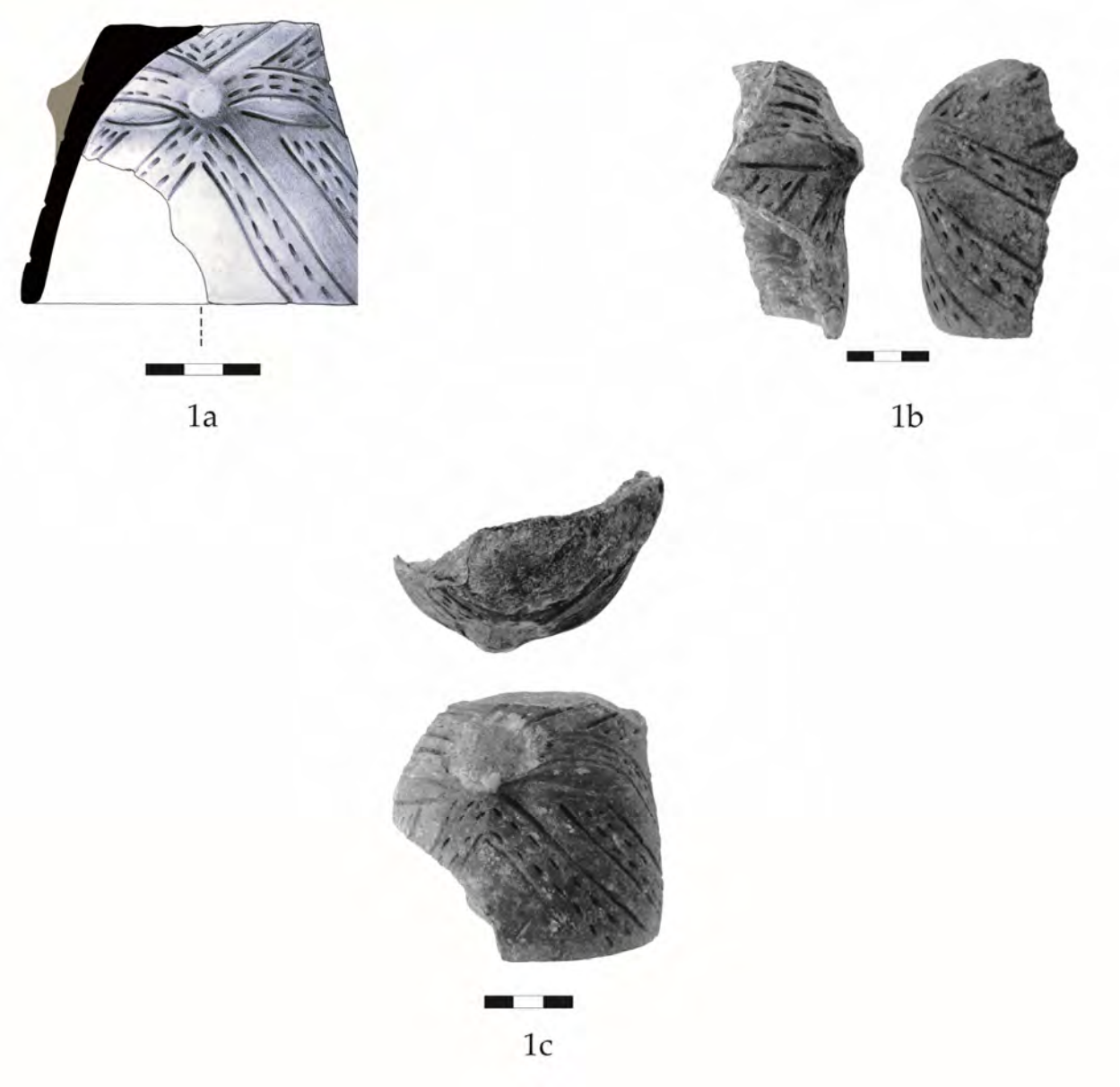
Pl. II. 1. Şoimuş-*La Avicola (Ferma 2)*, jud. Hunedoara. Complexul 239; 2a-c, 3a-b. Capace de lut din complexul 239 (desene C. Georgescu).
1. Şoimuş-*La Avicola (Ferma 2)*, Hunedoara. Feature 239; 2a-c, 3a-b. Clay lids from Feature 239 (drawings C. Georgescu).



Pl. III. 1. Şoimuş-*La Avicola (Ferma 2)*, jud. Hunedoara. Complexul 270 (plan şi profil); 2a-c. Capac de lut din complexul 270 (desen C. Georgescu).
1. Şoimuş-*La Avicola (Ferma 2)*, Hunedoara County. Feature 270 (plan and section); 2-ac. Clay lid from Feature 270 (drawing C. Georgescu).



Pl. IV. 1. Şoimuş-*La Avicola (Ferma 2)*, jud. Hunedoara. Complexul 444B (profil). 2a-c. Capac de lut din complexul 444B (desen C. Georgescu).
1. Şoimuş-*La Avicola (Ferma 2)*, Hunedoara County. Feature 444B (section); 2a-c. Clay lid from Feature 444B (drawing C. Georgescu).



Pl. V. 1a-c. Şoimuş-*La Avicola (Ferma 2)*, jud. Hunedoara. Capac de lut din stratul arheologic (desen C. Georgescu).
1a-c. Şoimuş-*La Avicola (Ferma 2)*, Hunedoara County. Clay lid from the archaeological layer (drawing C. Georgescu).

Analysis at microscope of some Gumelnița pottery fragments from Bordușani *Popină* tell settlement

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Constantin HAITĂ**

Abstract: *In this paper, there are presented the main results obtained through the study of a batch of 18 ceramic fragments, analysed at binocular microscope and at optical microscope in polarised light. These sherds come from Chalcolithic pots found in the tell settlement from Bordușani* Popină*, Ialomița County, and attributed to Gumelnița culture, phase A2. Thus, following the petrographic analysis three categories of ceramic fabric were confirmed, which were observed at macroscopic level and at stereomicroscope – fine, semi-fine and coarse – with some notable differences regarding the textural, of the microstructure, of the porosity and also compositional features.*

Rezumat: *În acest articol sunt prezentate principalele rezultate obținute în urma studiului unui lot de 18 fragmente ceramice, analizate la microscopul binocular și la microscopul optic cu lumină polarizată. Acestea provin din vase eneolitice descoperite în* tell*-ul de la Bordușani* Popină*, județul Ialomița, și sunt atribuite culturii Gumelnița, faza A2. Astfel, în urma analizei petrografice, au fost confirmate cele trei categorii de pastă observate la nivel macroscopic și la lupa binoculară – fină, semifină și grosieră – cu unele deosebiri notabile din punctul de vedere al caracteristicilor texturale, de microstructură, de porozitate și chiar compoziționale.*

Keywords: *Chalcolithic, Gumelnița, pottery fabric, optic microscopy analysis.*

Cuvinte cheie: *Eneolitic, Gumelnița, pastă ceramică, analiză la microscopul optic.*

◈ 1. Introduction

The archaeological site from Borduşani *Popină*, also known as Popina Mare, is situated at 2.5 km NE of the nearby village, in the forest district found in Balta Ialomiţei, at 800 m from Borcea branch of the Danube. The tell formed on an erosional remnant in the floodplain of the former lake Balta Ialomiţei and it reveals a complex stratigraphy exceeding 8 m in thickness.

In reverse order of deposition we can mention the discovery of artifacts belonging to a Getic settlement – La Tène period, with several levels of occupation, and Gumelniţa culture – phase A2, with numerous layers of occupation (S. Marinescu Bîlcu 1997).

Multidisciplinary research carried out here allowed for the observation of specific behavior patterns of these communities, in terms of resource management, mineral, animal and vegetable (D. Popovici *et alii* 2005).

◈ 2. Preliminary considerations

The main purpose of this article is to describe the types of pottery fabrics and the elements entailed by it, meaning the mineral composition and the nature of various

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inclusions, in order to understand the sourse of these materials as well as the treatment technique of the surfaces and the type of firing.

The term *fabric* was used in natural sciences in different ways. For instance, in petrography the term was chosen by some researchers to express the ensamble organisation of components, going beyond issues of structure and texture or their relative orientation. For some petrographic researchers the terms related to structure and texture are the same as the *fabric* (P. Bullock *et alii* 1985, p. 17).

Two elements must be taken into consideration when analysing pottery fabric: the matrix or the fine fraction consisting of clay, with mineral particles smaller than 0.002 mm and other larger inclusions (C. Orton *et alii* 1993, p. 67). Inclusions in the clay play an essential role, not only in the drying phase, but also during firing. They can already be naturally present in the paste or they can be added intentionally (P.M. Rice 1987 p. 93).

The two main components (the matrix and the inclusions) vary on the raw material selected by the potter and on the method of preparation. One must take into account the fact that both are more or less influenced by the combustion conditions (C. Orton *et alii* 1993, p. 67).

◈ 3. Methodology

For this study we selected pottery samples from five dwellings and one passage area. The pottery fragments were analysed using a binocular microscope in order to establish the main fabric types. In consequence, three main cathegories were identified and a total number of 18 ceramic fragments were attributed to fine paste (2), semi-fine paste (14) and coarse paste (2).

For the petrographic analysis an optical microscope with transmitted light in thin section was used. For obtaining the thin sections the samples were impregnated with a sintethic resin in a vaccum chamber. After polymerizing of the resin and its hardening, the samples passed trough a diamond disc cutting machine and a polishing device, in order to obtain the thin sections. Eighteen sections were obtained, with a thickness of 0.025 mm and perpendicular to the surface of the chosen pottery sherds.

The miscroscope analysis was done using a Olympus BX 60 device, at magnification of x50 - x500, in plane polarised light (PPL) and in crossed polarised light (XPL). The microscope study was performed in the laboratory of "Alexandra Bolomey" National Center of Pluridisciplinary Researches within the National Museum of Romania History.

Using an optical microscope in order to perform the analysis of materials such as clay, adobe, mortar, plaster and other, obtained by means of a mixture preparation, one must take into consideration the main sedimentary characteristics, such as: texture, microstructure, porosity, composition, homogeneity and color (C. Haită 2012a, p. 87).

In order to properly characterize the texture, the dimensional categories were established on the basis of *Udden-Wentworth* grainsize scale, adapted to Romanian terminology (N. Anastasiu, D. Jipa 1983, p. 19), due to the fact that ceramic paste is based on a mixture of natural sediments. The texture analysis allows us not only the description of the granules from a sherd, but also their distribution and size, and to a lesser extent, the organisation of the material (C. Orton 1993, p. 141).

The microstructure observed in the microscope analysis represents a complex sedimentary characteristic, it express the disposition and the relative size of the constituents, the size and shape of pores, the ratio between the voids and the solid fraction, as well as the organization of the whole (C. Haită 2012a, p. 90).

Porosity is expressed by shape and size of the pores, their orientation and the ratio between their volume and the volume of the solid fraction. Porosity entails the physical and chemical changes undergone by the sediments over the preparation and firing. The vesicular porosity of materials prepared by mixing indicates the homogeneity of the material when wet, following the discharge of air bubbles, while channel porosity is noticed when dealing with paste mixed with vegetal materials, like straw or chaff. The cracks derived by firing transformation are easily recognised at microscope by their dimensions and orientation.

Composition refers to the whole of the organic and mineral compounds that can be identified at the microscopic level. The study of the compounds allows for identification of their origin, as well as the manner and the degree of transformation.

The degree of homogeneity is expressed by the relative proportion and the distribution of the sedimentary compounds. The homogeneity varies highly in archaeological materials. In the case of prepared materials we ussualy can notice a high degree of homogeneity, and only accidentally we can observe constituents outside of the "recipe" (C. Haită 2012a, p. 96).

The color expresses the whole composition, the nature of the compounds (rarely, with an interpretative meaning, like in the case of iron compounds or organic matter) and their distribution (discrete inclusions or oxides stains in the clay), but also the firing conditions (temperature, time, firing atmosphere). Though it is very important that the color description be based on the MunsellSoil Color Charts, this is an endevor made very difficult when using a microscope. Moreover, the color may vary on the same pottery sherd depending on the firing conditions. Thus, the color reflects not only the composition of the raw material, but also the firing technology of the artefact, as well as its post-deposional history (P.S. Quinn 2013, p. 42).

◈ 4. Description of the identified ceramic fabric categories

Macroscopic observations and at binocular microscope

Fine ceramic, the most spectacular, has an overall fine texture and is highly homogeneous. The fine matrix shows smashed pottery inclusions, with general dimensions under 1 mm, rare and very rare. The color of the fabric varies from black to dark gray (10YR 2/1 to 7.5YR 4/1). The firing is generally oxidizing, incomplete, but also, rarely, reductive. The surface is smooth or coverd with a fine textured slip.

Semi-fine ceramic entails medium texture fabric, good homogeneity and contains inclusions of smashed pottery, with dimensions between 1-2 mm, quite frequent. Moreover, white mica granules are noticeable, representing natural inclusions. Generally, the firing is incomplete and it leads to differences in color between the inside and outside surfaces and central area (the core) of the sherd. Thus, the color varies from reddish yellow to gray (7.5YR 6/6 to 2.5Y 6/1). The surface is generally smooth.

Coarse ceramic shows a rough texture, heterogeneous, even to a large extent. The prevailling inclusions consist of smashed pottery, with dimensions of up to 2 mm, they are very frequent, alongside with shell fragments. Most often, the firing is incomplete and the color varies from reddish yellow to dark gray (7.5YR 6/6 to 10YR 4/1). The surface is generally smooth.

Microscope observations

Fine ceramic shows a very fine texture characterized by a silty clay matrix, with silt with a frequency of 3-5%, very fine sand, up to 100 μm, with a frequency of approx. 1% and a few granules of medium sand, with a frequency of up to 1%. The degree of sorting of the granules is generally good and rarelly, very good. Homegeneity is very good (pl. I/1-2).

The identified minerals are quartz, measuring 60-200 μm and a frequency of 3-5%, plagioclase feldspar measuring 10-200 μm and a frequency under 1% (pl. I/3), mica (pl. I/4) (muscovite, rarelly biotite), irregularly shaped carbonates, measuring up to 30 μm and a frequency of under 1%.

Iron oxides have been identified in the shape of ferruginous impregnations, reddish in color, rounded in shape, measuring between 20-50 μm and a frequency of 2-3%.

Anthropic inclusions consist of smashed pottery granules, under isomeric form, slightly irregular, generally angular, measuring 140-600 μm and a frequency of 2-3%, dark brown in color (pl. I/5). Alongside these, other organic inclusions were observed, consisting of fine vegetable remains, measuring 10-20 μm, with a frequency of 5-10%, mostly opaque, with irregular shape, and other with larger dimensions, of up to 100 μm, and a frequency of approx. 1% (pl. I/6). The degree of sorting is good.

The porosity is represented by vesicular voids and channels, measuring up to 2 mm and a variable frequency of 5-10%. Slightly irregular chambers can also be observed, measuring 1-2 mm and a frequency of 2-3%. Cracks are generally present at the edges of sherds, are cvasi-parallel, but rare (1-2%).

Rarely encountered is the treatment of the exterior surface with a fine layer of about 60 μm thickness, made out of clayey silt - silty clay (pl. II/1). Most often, both the outer and the inner surfaces are smoothed.

Firing was generally performed in an oxidizing ambiance and is incomplete.

Semi-fine ceramic is caractherized by a silty clay matrix, but also sandy clay with silt that contains medium and coarse silt, measuring up to 63 μm, with a frequency of 7-10%, fine sand measuring up to 100 μm, with a frequency of 3-5%, and rare medium sand granules, of up to 200 μm, with a frequency of 1-2%. The degree of sorting is generally good and rarely the sorting is moderate. The homogeneity of the prepared material is good (pl. II/2).

Like in the previous case, the minerals observed are frequent quartz grains, measuring 70-400 μm, with a frequency of 2-3%, monocrystalline grains of feldspar with a rounded contour, measuring 50-100 μm, mica (muscovite) measuring 50-200 μm and a frequency of 2-3% and brownish carbonates, with microcrystalinne calcite, measuring 40-200 μm and a frequency of about 1%, as well as a few granules measuring 0.7-1.6 mm.

Anthropic inclusions consist of smashed pottery fragments with isometric shape, angular, measuring up to 500 μm, with a frequency of 3-5% and rarely (under 1%) measuring 1-2 mm (pl. II/3). Reddish brown silty clay granules were rarely observed, rounded, measuring between 200 μm and 2 mm, with a frequency of 1-2%, generally poorly sorted. Moreover, just as rarely (about 1%) are also noticeable light brown flint fragments, measuring between 0.6 and 1.5 mm and medium brown shell fragments measuring 400-600 μm, with a frequency of 1% (pl. II/4). The degree of sorting is medium.

Organic inclusions consist of fine vegetable remains, measuring 10-20 μm and a frequency of 5-10%, generally opaque, irregular in form and rarely (2-3%) reaching 300 μm.

Porosity is expressed through isolated pores, vesicular and elongated, but also irregular, measuring 40 μm - 2.5 mm, with a frequency of 5-7%. Rarely, with a frequency of up to 1% we can notice channels with a maximal lenght of 1.7 mm (pl. II/5). Fine cracks were noticed cvasi-parallel with the edges of the pottery sherds, both exterior and interior.

Treatment of the surfaces was done by smoothing (pl. II/6), both interior and exterior.

Firing is generally oxidizing, but incomplete (pl. III/2), resulting in a yellowish brown or light brown color, and sometimes observing a gradual transition from outside towards the inner part.

Coarse ceramic is caractherised by a silty clay matrix containing 3-5% silt, very fine sand, measuring up to 80 μm and a frequency of up to 10%, and medium sand of up to 200 μm with a frequency of 2-3%. The degree of sorting of the granules is poor to medium. Uniformity is pretty low, the mixture is generally heterogeneous (pl. III/3).

As in the case of the other two types, the minerals observed are frequent mono-crystalline quartz grains, measuring 200-400 μm, with a frequency of 3-5%, feldspars measuring 50-250 μm and a frequency of 1-2%, mica (muscovite, rarely biotite), measuring 50-200 μm and a frequency of 2-3%, rare carbonate granules measuring 60-120 μm and rarely up to 1.6 mm.

Inclusions consist of smashed pottery granules of isometric form, angular, measuring 600 μm - 1.4 mm, with a frequency of approx. 10% (pl. III/4). Medium brown flint fragments were present very rare (under 1%), measuring approx. 300 μm (pl. III/5). Alongside these, as in the cases of the other two fabric types, organic inclusions consist of fine vegetable remains, measuring 10-20 μm, with a frequency of 5-10%, generally opaque, irregular, but also encountering fragments of larger dimensions of up to 300-350 μm, with a frequency of 2-3%. The degree of sorting is poor.

Porosity is expressed through isolated pores, vesicular and elongated, but also irregular, as well as channels, measuring up to 1.4 mm, with a frequency of approx. 10%. Fine cracks, of about 200 μm, with a frequency of up to 1%, were noticed both in the exterior and the interior area of the sherd.

Surface treatment, both inside and outside, is generally done by smoothing.

Firing is generally oxidizing, incomplete (pl. III/6), with gradual transition from outside to inside.

◈ 5. General characteristics of the *fabric* in the analyzed ceramic batch

Texture

All 18 pottery sherds show a sedimentary matrix with a fine and medium texture, if we are to refer to the textural categories of sediments (Udden-Wentworth grainsize scale).

Fine ceramic fabric is made out of, for all the analyzed fragments, very fine silty clay. The coarse fraction is represented by silt, rarely (approx. 1%) by fine sand and medium sand granules, with a frequency under 1%. From a mineralogical point of view, this fraction is represented by monocrystalline quartz, poorly rounded, with good sorting, rare feldspar granules and well sorted mica granules.

The degree of sorting is good and very good, for all the analyzed cases, indicating a natural, non mixed sediment.

Semi-fine fabric consists of silty clay with fine silt and rarely of fine sandy silty clay, with silt (3-5%) and fine sand measuring 80-100 μm (1-2%). Sorting is medium and indicates most likely a natural sediment, without mixture.

Coarse fabric consists of sandy silty clay that contains silt (3-5%), fine sand, measuring 80-100 μm (10%), medium sand up to 200 μm (2-3%) and coarse sand up to 400 μm (2%). In this case sorting is weak, suggesting a mixture of sediments, probably intentionall, even if the mixture could have taken place at the moment of sampling from the contemporary alluvium.

Microstructure

All 18 fragments present an open porphyric microstructure, while the clay shows generally a chitonic relative distribution, being oriented around the granules.

Fine pottery has a very homogeneous microstructure with fine inclusions, and in the case of one fragment we could notice clay domains oriented oblique to the wall (pl. II/1).

Semi-fine ceramic presents a more complex microstructure, but homogeneous, presenting a porphiric distribution of burned, reddish brown clay fragments, measuring between 200 μm and 2 mm, and also birefringent clay domains oriented on two directions (pl. III/1).

Coarse ceramic present a heterogeneous porphyiric microstructure, expressed by the frequent crushed pottery inclusions.

Porosity

As observed in previous study, the porosity is essentially represented by two types of pores. The first type is represented by isolated pores, either circular, formed by mixing the wet material (air bubbles trapped in clay) or voids and channels resulted from burning the organic materials added to the mixture (C. Haită 2012b, p. 116).

The second type of porosity is represented by the fine cracks less than 1 mm wide parallel / cvasi-parallel to the wall of the pottery and relatively rare, with a frequency of 1-2%, observed in all the three categories of ceramics. These cracks are interpreted as formed during combustion by the rapide elimination of the water.

Composition

All pottery sherds contain in their compositon smashed pottery fragments and fine vegetable remains. It was noticed that some fragments of pottery include others in turn, this indicating reuse of ceramic material with size of approx. 400 μm and a frequency of no more than 1%. The degree of sorting of the inclusions is medium.

Reddish brown plant fragments were observed in the composition of all types of ceramic paste. In the case of fine ceramic these organic inclusions are very fine, with sizes of 10-20 mm and frequency of up to 10%. In the case of the other two catergories they are larger in size, up to 120 μm, less frequent (3-5%), and generally opaque (pl. I/6).

Semi-fine and coarse ceramic fabrics show very rare shell fragments, yellowish brown in color, measuring between 400 μm - 1.2 mm and a frequency under 1%.

In the case of two sherds of coarse and semi-fine categories, fragments of fine flint, light brown, rounded, with dimensions between 600 mm and 1.5 mm were identified. Few grains of charcoal have rarely been observed, accidentally integrated in the semi-fine paste.

Color

Fine pottery has a color ranging from yellowish to medium and dark brown, but it is uniform in the sherd's profile.

The color of semi-fine pottery ranges from reddish brown to dark brown and, in most cases, the color of the inside and outside surface of the sherd is different.

Coarse ceramic has a color that also shows variation of yellowish brown to dark brown, and the pottery fragments show color variations in the profile.

◈ 6. Conclusions

Microscopic analysis confirmed the paste types studied with the binocular microscope, but also brought important detailed information on both the sedimentary matrix and inclusions, and on how the mixture is achieved, the surface treatment and combustion conditions.

The texture and degree of sorting of the matrix indicates the use of naturally occurring sediments, generally without mixing. In the case of coarse paste, there may be a mixture, possibly intentionally, of fine sediments with fine to medium sands.

The inclusions are generally well sorted, with slightly larger dimensions where coarse paste is involved. It was noticed that some of the sherds contained crushed pottery fragment inside them, indicating ceramic material reuse. Moreover, it is expected that, in general, the resulting material is fine and well prepared.

Surface treatment – slip is very rare in the ceramic batch analyzed and present only in the case of the fine paste.

Firing is generally oxidizing, but incomplete, without identified changes in the minerals that might occur over 700° C. This is also indicated by the preservation of plant inclusions.

◈ Acknowledgments

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◈ Bibliography

N. Anastasiu, D. Jipa 1983 — *Texturi și structuri sedimentare*, Editura Tehnică, București.

P. Bullock *et alii* 1985 — P. Bullock, N. Fedoroff, A. Jongerius, G. Stoops, T. Tursina, *Handbook for soil thin section description*, Waine Research Publications, Wolverhampton.

C. Haită 2012a — *Sedimentologie și micromorfologie. Aplicații în arheologie*, ediția a II-a, Biblioteca Muzeului Național, Seria Cercetări Pluridisciplinare XII, Editura Cetatea de Scaun, Târgoviște.

C. Haită 2012b — Observations at microscope on pottery fabric of some ceramic fragments from Gumelnița tell settlements Hârșova and Bordușani Popină, *SP*, 9/2012, p. 113-121.

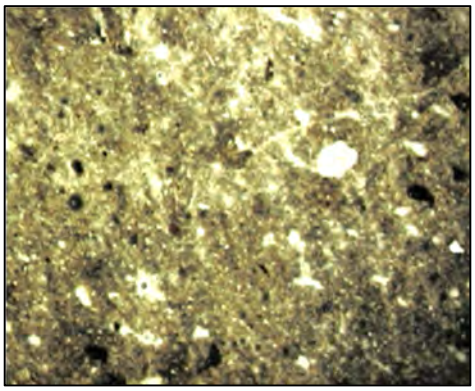
S. Marinescu-Bîlcu 1997 — Historical background, in S. Marinescu-Bîlcu *et alii*, Archaeological Researches at Borduşani Popină (Ialomiţa county). Preliminary report 1993-1994, *CA*, X, p. 35-38.

C. Orton *et alii* 1993 — C. Orton, P. Tyers, A. Vince, *Pottery in archaeology*, Cambridge Manuals in Archaeology, Cambridge University Press, Cambridge.

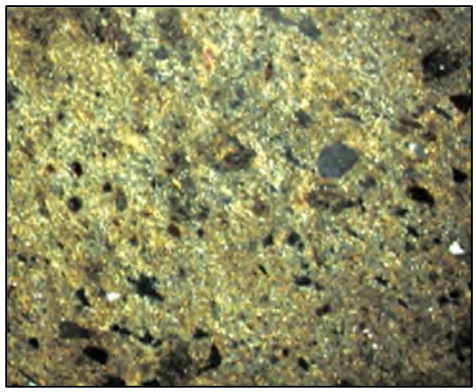
D. Popovici *et alii* 2005 — D. Popovici, F. Vlad, A. Nălbitoru, M. Mărgărit, *Cronica*, *Campania 2004*, http://cronica.cimec.ro/detaliu.asp?k=3074.

P.M. Rice 1987 — *Poterry analysis. A source book*, The University of Chicago Press, Chicago and London.

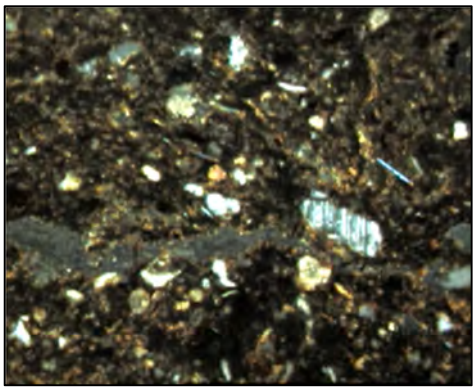
P.S. Quinn 2013 — *Ceramic petrografy. The interpretation of archaelogical pottery & related artefact in thin section*, Oxuniprint, Oxford.



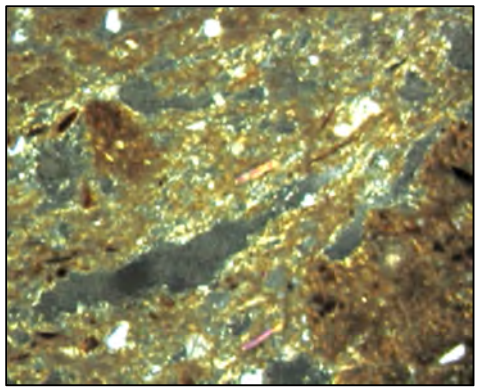
1. Fine fabric. PPL, f.w. 2 mm.
Pastă fină. PPL, l.i. 2 mm.



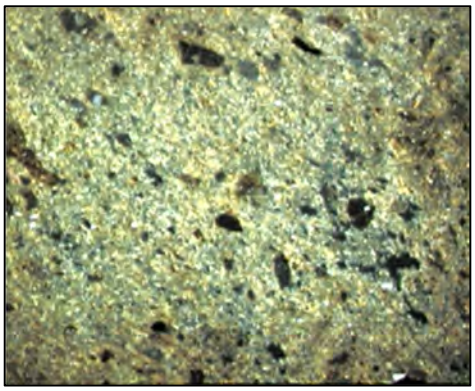
2. Fine fabric. XPL, f.w. 2 mm.
Pastă fină. XPL, l.i. 2 mm.



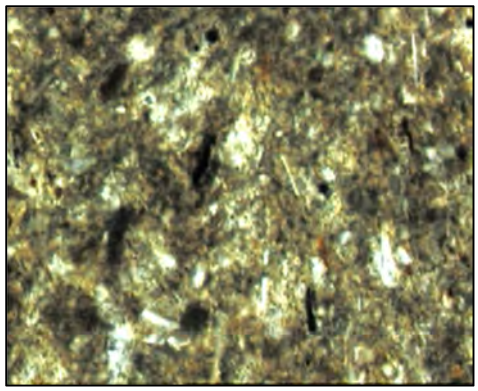
3. Fine fabric with grains of quartz and plagioclase. XPL, f.w. 0.5 mm.
Pastă fină cu granule de cuarț și feldspat plagioclaz. XPL, l.i. 0,5 mm.



4. Fine fabric with grains of muscovite. XPL, f.w. 0.5 mm.
Pastă fină cu granule de muscovit. XPL, l.i. 0,5 mm.

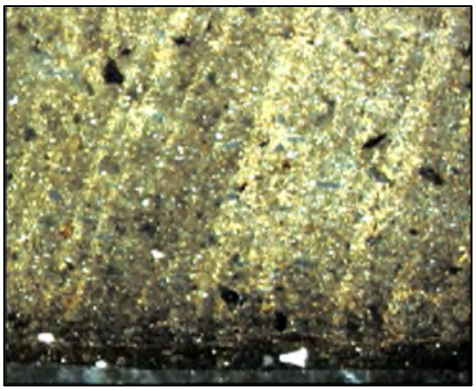


5. Fine fabric with fine inclusions of pottery fragments. XPL, f.w. 0.5 mm
Pastă fină cu incluziuni fine de fragmente ceramice. XPL, l.i. 0,5 mm.

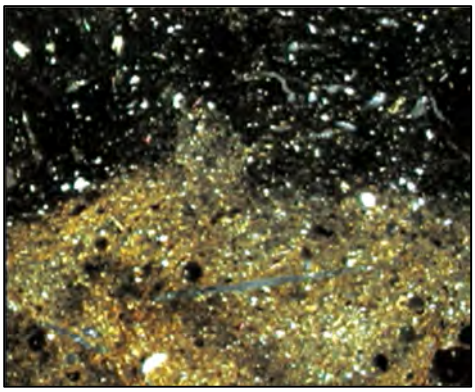


6. Fine fabric with fine opacitised vegetable fragments. PPL, f.w. 0.2 mm.
Pastă fină cu fragmente vegetale fine, opacizate. PPL, l.i. 0, 2 mm.

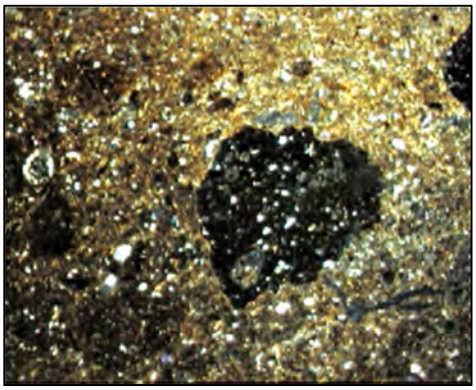
Pl. I. Photos at microscope. PPL – plane polarised light; XPL – crossed polarised light; f.w. – frame width.
Imagini la microscop. PPL – lumină plan polarizată; XPL – lumină polarizată încrucișat; l.i. – lățime imagine.



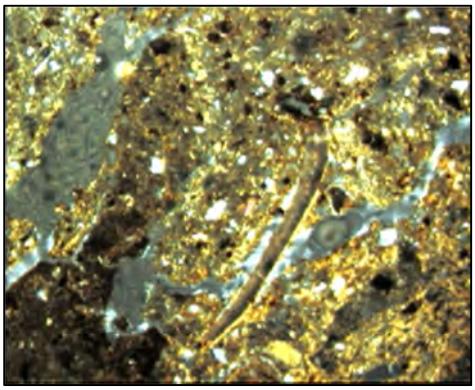
1. Fine fabric – oblyque orientation of clay and the surface finishing. XPL, f.w. 2 mm.
Pastă fină – orientarea oblică a argilei și finisarea suprafeței. XPL, l.i. 2 mm.



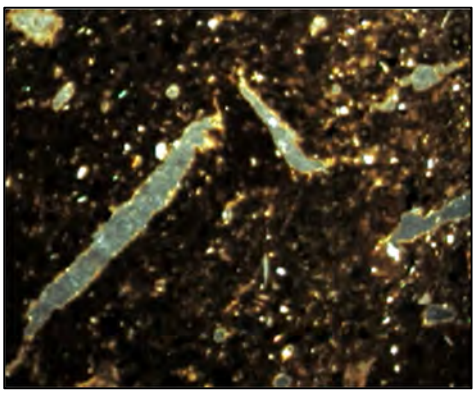
2. Semi-fine fabric. XPL, f.w. 2 mm.
Pastă semifină. XPL, l.i. 2 mm.



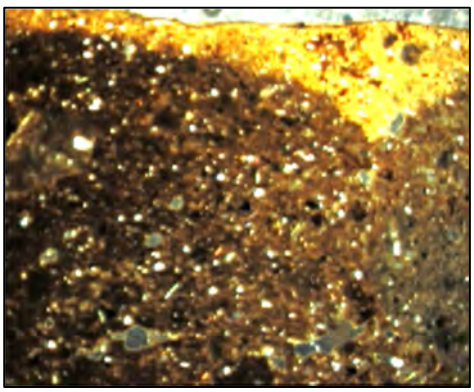
3. Semi-fine fabric. Pottery fragment inclusion. XPL, f.w. 2 mm.
Pastă semifină. Incluziune de fragment ceramic. XPL, l.i. 2 mm.



4. Semi-fine fabric with shell fragment inclusion. XPL, f.w. 2 mm.
Pastă semifină cu incluziune de fragment de scoică. XPL, l.i. 2 mm.

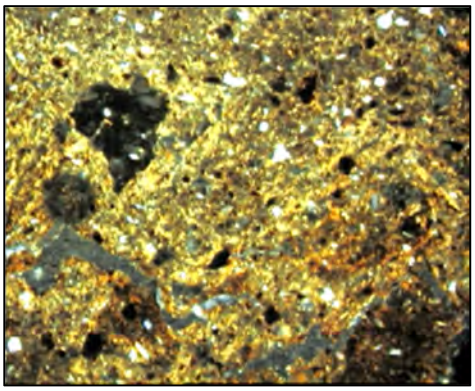


5. Semi-fine fabric with porosity with channels. XPL, f.w. 2 mm.
Pastă semifină cu porozitate cu canale. XPL, l.i. 2 mm.

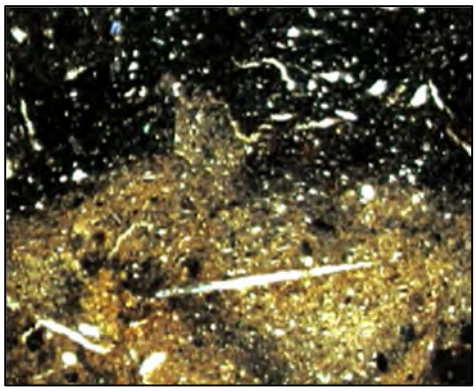


6. Semi-fine fabric. Surface treatment by smoothing. XPL, f.w. 2 mm.
Pastă semifină. Tratarea suprafeței prin netezire. XPL, l.i. 2 mm.

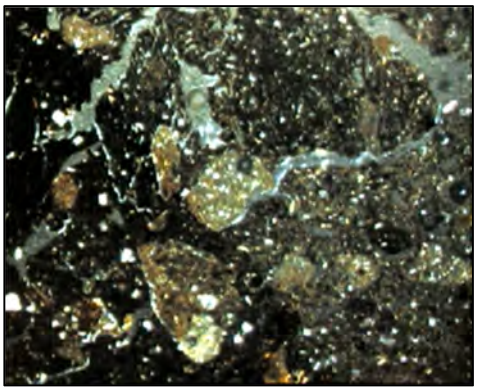
Pl. II. Photos at microscope. PPL – plane polarised light; XPL – crossed polarised light; f.w. – frame width.
Imagini la microscop. PPL – lumină plan polarizată; XPL – lumină polarizată încrucișat; l.i. – lățime imagine.



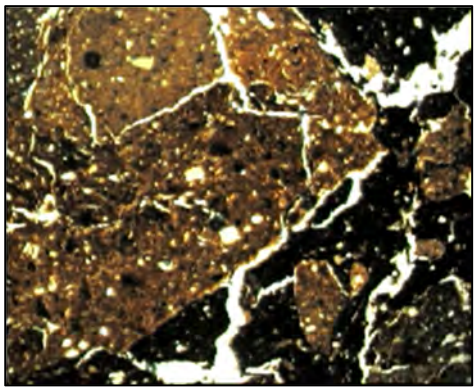
1. Semi-fine birefringence fabric – clay oriented on two directions. XPL, f.w. 1 mm.
Pastă semifină cu argilă birefringentă orientată pe două direcții. XPL, l.i. 1 mm.



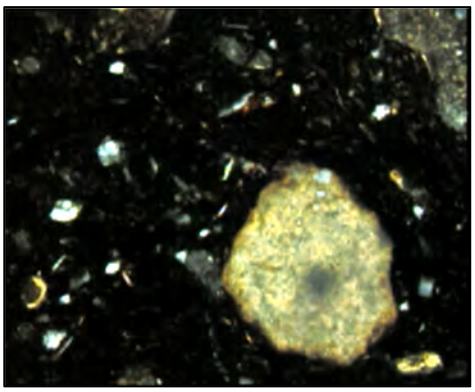
2. Semi-fine fabric, limit of zones with different burning. PPL, f.w. 2 mm.
Pastă semifină, limită a unor zone cu ardere diferită. PPL, l.i. 2 mm.



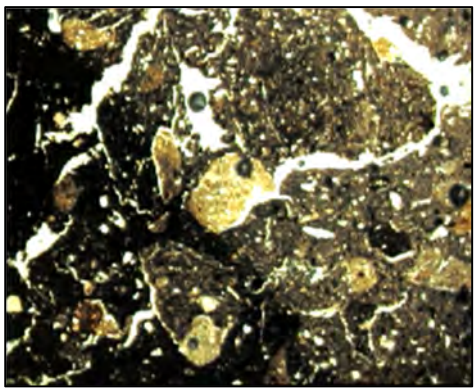
3. Coarse fabric. XPL, f.w. 2 mm.
Pastă grosieră. XPL, l.i. 2 mm.



4. Coarse fabric with large inclusions of pottery fragments. PPL, f.w. 2 mm.
Pastă grosieră cu incluziuni mari de fragmente ceramice. PPL, l.i. 2 mm.



5. Coarse fabric with flint fragment inclusion. XPL, f.w. 0.5 mm.
Pastă grosieră cu incluziune de silex. XPL, l.i. 0,5 mm.



6. Coarse fabric with frequent ceramic inclusions. PPL, f.w. 2 mm.
Pastă grosieră cu frecvente incluziuni ceramice. PPL, l.i. 2 mm.

Pl. III. Photos at the microscope. PPL – plane polarized light; XPL – crossed polarized light; f.w. – frame width.
Imagini la microscop. PPL – lumină plan polarizată; XPL – lumină polarizată încrucișat; l.i. – lățime imagine.

Note despre două sârme din aur din cultura Gumelniţa

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Katia MOLDOVEANU[**]
Migdonia GEORGESCU[***]

Rezumat: *În acest articol sunt prezentate două sârme din aur descoperite în tell-urile gumelniţene de la Morteni, judeţul Dâmboviţa şi Balaci, judeţul Teleorman. Autorii analizează posibilitatea existenţei unei circulaţii a aurului sub formă de sârmă, ca produs semifinit, în arealul culturii Kodjadermen-Gumelniţa-Karanovo VI. În investigarea acestei ipoteze au fost utilizate argumente tipologice şi s-a făcut apel la ultimele analize atomice efectuate pentru piesele din arealul de la sud sau de la nord de Dunăre. De asemenea, în articol sunt prezentate rezultatele analizelor FRX efectuate pe cele două piese de aur.*

Abstract: *In this paper the authors present two gold wires, discovered in the Gumelniţa tell settlements from Morteni, Dâmboviţa County and Balaci, Teleorman County. The authors take into consideration the possibility that these wires represent one of the forms of gold circulation in the Chalcolithic period. While exploring this possibility there are used the typological arguments and the latest chemical analysis of Gumelniţa gold pieces from South and North of Danube are brought into discussion. The results of the XRF analysis of the two golden wires are also presented.*

Cuvinte cheie: *aur, eneolitic, cultura Gumelniţa, analize FRX.*

Keywords: *gold, Chalcolithic, Gumelniţa culture, XRF analysis.*

◈ Introducere

Proprietăţile fizice ale aurului – strălucirea şi maleabilitatea, au făcut ca din acest metal să fie obţinute obiecte de podoabă şi prestigiu în Peninsula Balcanică încă din eneolitic. Metalurgia aurului este strâns legată de cea a cuprului (V. Leusch *et alii* 2015, p. 367-371), iar aceste achiziţii tehnologice se consideră a se fi produs datorită complexităţii proceselor pirotehnologice impuse de arderea ceramicii (D.W. Bailey 2000, p. 227; A. Vulpe 1973, p. 217-218).

Cultura Kodjadermen-Gumelniţa-Karanovo VI, ale cărei urme materiale sunt răspândite de la munţii Carpaţi la Marea Egee şi de pe litoralul vestic al Mării Negre la munţii Rodopi, Valea Iskeruk şi Valea Oltului, este cunoscută în primul rând datorită spectaculozităţii necropolei de la Varna (D.W. Bailey 2000, p. 204-208). Aici au fost identificate peste 1814 obiecte din aur, printre cele mai vechi descoperiri din acest metal, cântărind 5399 grame, majoritatea pieselor concentrându-se în mormintele simbolice nr. 1, 4, 36, cele trei morminte cu mască şi mormântul de bărbat nr. 43. Încă de la început, prezenţa pieselor din aur şi cupru într-un număr limitat de morminte a fost considerată ca atestând existenţa unor structuri sociale ierarhice (I.S. Ivanov 1978; I. Ivanov 1988; V. Slavchev 2011). De fapt, contextele arheologice şi analogiile etnografice susţin ipoteza că aurul şi cuprul au fost investite, încă din acele timpuri, cu valori sociale, simbolice şi economice (B. Gaydarska, J. Chapman 2008; D. Gheorghiu 2012, p. 288-292; F. Klimscha, 2014, p. 154-159; C.E. Ştefan 2008, p. 81-82).

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La nivelul actual al cercetării se conturează o frecvenţă mai mare a pieselor din aur în necropole decât în aşezări, cu precădere în cele din arealul sud-dunărean al culturii Kodjadermen-Gumelniţa-Karanovo VI. În cimitirele de la Durankulak (K. Dimitrov 2002, 147-148), Devnja (H. Todorova-Simeonova 1971, p. 12-13), Goljamo Delčevo (H. Todorova 1975, p. 63, 238-239, pl. 126/4-6, 127/5-6), Viniča (A. Radunčeva 1976, p. 87-88, fig. 89) au fost descoperite între 5 şi 20 de morminte cu piese din aur. Dar, sunt cimitire atât la sud de Dunăre, de exemplu Radingrad (T. Ivanov, D. Dilov 2011, p. 133-134, 140), şi mai frecvent în arealul nord-dunărean, cum este cazul la Chirnogi *Şuviţa Iorgulescu*, Chirnogi *Şuviţa lui Ghiţan* (V. Cojocaru, D. Şerbănescu 2002, p. 85-86) sau Vărăşti (E. Comşa 1995, p. 118-119) unde doar în 1-2 morminte s-au descoperit câte una-două piese de aur, după cum există necropole unde nu au fost identificate morminte care să conţină piese de aur. În această ultimă situaţie par a fi cimitirele de la Căscioarele *D'aia Parte*, Chirnogi *Terasa Rudarilor*, Dridu, Gumelniţa I, Gumelniţa II, Mărіuţa *La Movilă* (C. Lazăr 2011) sau cele de la Kosharna (D. Cernakov 2011, p. 118-119), Kamenovo (D. Cernakov, D. Dilov 2014, p. 156-157).

În aşezări, obiectele din aur s-au găsit atât tezaure, cum sunt cele de la Hotnitsa (S. Chohadzhiev 2009, p. 68; G.I. Georgiev 1978, p. 72, fig. 6), Sultana (C. Hălcescu 1995) sau Balaci (D. Leahu 1992, p. 114-116; S. Oanţă-Marghitu 2013a, p. 38), dar și piese izolate, atât la nord de Dunăre – la Gumelniţa, Pietrele, Sultana, Vidra, Vităneşti, Bucşani, Vlădicească, Morteni (S. Oanţă-Marghitu 2013a, p. 37), cât şi la sud de Dunăre – la Ruse (D. Chernakov 2009, p. 36, 72-73), Hotnitsa (A. Chohadzhiev 2009, p. 69; S. Chokhadzhiev 2010), Kosharitsa (C. Hălcescu 1995, p. 12).

În afară de aceste paliere de analiză, al contextelor arheologice ale pieselor şi al relevanţei lor sociale, obiectele preistorice de aur ridică alte probleme, la fel de complexe, cum sunt cele referitoare la zonele de procurare a materiei prime, la tehnicile de prelucrare, la modalităţile şi ariile de circulaţie.

◈ Contextul de descoperire al pieselor

Primul dintre obiecte provine din *tell*-ul gumelniţean de la Morteni, jud. Dâmboviţa. Este o sârmă de secţiune circulară (fig. 1), cu diametrul variind între 0,262-0,269 cm, a cărei lungime desfăşurată măsoară 12,53 cm, îndoită în două părţi aproximativ egale, cu capetele rotunjite şi prezentând urme de lustru la una din margini. Obiectul are o greutate de 10,78 g. A fost descoperit în anul 1976, în SI, careu 1, la adâncimea de – 0,95 m. Piesa a fost considerată ca provenind din nivelul II, atribuit culturii Gumelniţa, etapa A2 (P. Diaconescu 1978-1979, p. 101). A fost interpretată ca fiind reprezentativă pentru una din formele de circulaţie a aurului în epocă (A. Ilie 2013, p. 175).

Cea de-a doua piesă, provine din tezaurul de la Balaci. Acesta, format dintr-un pectoral, o sârma şi o brăţară de aur, a fost descoperit întâmplător în marginea *tell*-ului de la Balaci *Măgură*, jud. Teleorman, aparent în asociere cu oase umane. Iniţial, tezaurul a fost atribuit, pe baza morfologiei brăţării, populaţiei hunice şi datat în sec. V e.n. (S. Dolinescu-Ferche 1963). Ulterior, contextul descoperirii şi analogia pectoralului şi brăţării cu piese asemănătoare din necropolele de la Varna au determinat reatribuirea tezaurului culturii Gumelniţa (D. Leahu 1992).

Piesa în cauză este o sârmă de secţiune circulară, îndoită ca o verigă, cu capetele drepte. Prezintă o lungime desfăşurată de 12,4 cm şi o greutate de 10,50 g (S. Oanţă-Marghitu 2013b, p. 176) (fig. 1).

Surprinzătoare sunt asemănările în formă, lungime desfăşurată şi gramaj ale celor două piese supuse studiului.

◈ Există o circulaţie a aurului sub forma unor produse semifinite?

Sârmele de aur de la Morteni şi Balaci ridică problema funcționalității acestora, în condiţiile în care tipologia obiectelor din aur descoperite în mediul Gumelniţa este diferită. Marea majoritate a artefactelor din aur întâlnite în mediul cultural gumelnițean sunt: perle, pandantive, *saltaleone*, inele, ţinte pentru ureche sau buză, brăţări, bucşe, aplice pectorale etc (I. Ivanov 1988; H. Todorova, I. Vajsov 2001).

În aceste condiţii, putem lua în considerare ipoteza ca sârmele să fi fost utilizate drept modalitate de circulaţie a aurului ca prefabricat?

Analiza tipopogică şi tehnologică efectuată pe artefactele de aur din necropola de la Varna a dus, ţinând cont de secvenţele de fabricare, la regruparea unor serii de piese diferite din punct de vedere morfologic, cum ar fi anumite tipuri de mărgele, inele, brăţări pentru antebraţ, cercei, plăci decorative şi figurative. Toate aceste tipuri de piese au în comun utilizarea unor prefabricate de tipul sârmelor sau foilor obţinute prin turnare în forme cu şănţuiri de secţiune circulară, ovoidală sau dreptunghiulară. Din această serie tehnologică ne reţin atenţia, datorită similitudinilor morfologice cu cele două sârme, verigile. Această subcategorie tehnologică este considerată a doua cea mai frecventă categorie de obiecte din necropola de la Varna şi integrează verigi mari, cum ar fi brăţările pentru antebraţ din mormintele 4 şi 1, dar şi obiecte mai mici, cercei, inele, verigi şi mărgele decorative (K. Dimitrov 2013, p. 62; H. Todorova, I. Vajsov 2001, p. 45, 75-76, 80-81). Dimensiunile acestor elemente de podoabă variază. Astfel, brăţările de antebraţ din mormintele 1 şi 4, lucrate din sârme de aur cu grosimi de la 4,1 la 0,4-0,5 cm, au diametre de la 11,8 la 6,7 cm şi cântăresc de la 51 la 268 g (I. Ivanov 1988, p. 183, 189-190). Dar mult mai numeroase sunt verigile mici din sârmă de aur cu grosimi de 0,1-0,3 cm, cu diametre variind între 1,15 cm şi 4,75 cm, cu masă ce nu depăşeşte 2-5 g, cum sunt inelele şi cerceii, în formă de anouri sau verigi, din mormintele 1, 41, 97 (I. Ivanov 1988, p. 183-186, 198-199, 205-207).

În spaţiul de la nord de Dunăre, de-a lungul timpului, au fost scoase la iveală mici sârme de secţiune dreptunghiulară sau circulară, cântărind până în 2 g fiecare, cum este veriga din aşezarea de la Glina, atribuită fazei Vidra a culturii Boian, sau cele de la Gumelniţa, Sultana sau Ariuşd, datate în eneoliticul târziu (E. Comşa 1974, p. 13-17; D. Şerbănescu 2013, p. 172-173).

Veriga descoperită în aşezarea de la Gumelniţa, cu diametrul de 0,18 cm, este lucrată din foiţă de aur de secţiune dreptunghiulară (Vl. Dumitrescu 1924, p. 341, fig. 9/8), ca şi veriga individuală din tezaurul de la Sultana. Ultima prezintă un diametru de 0,07 cm şi cântăreşte 0,23 g (V. Cojocaru, D. Şerbănescu 2002, p. 85, fig. 1/h). Celelalte verigi din aşezarea de la Sultana, cum sunt verigile înlănţuite din tezaur, au fiecare un diametru de circa 1,09 cm, grosimea sârmei de 0,08 cm şi masa sub 1 g (D. Şerbănescu 2013, p. 173).

Deşi în necropola de la Varna nu sunt obiecte realizate din sârme asemănătoare cu cele analizate de noi, despre unele dintre verigile din aur de la Hotnitsa ştim că au fost realizate din sârmă cu secţiune circulară, având o lungime desfăşurată de circa 12,2 cm (S. Chokhadzhiev, A. Chokhadzhiev 2005, p. 11, fig. 8; A. Chohadzhiev 2009, p. 68-69, fig. 18).

Aceste exemple susţin existenta unei producţii de bare de aur cu secţiuni circulare, ovoide sau plate, şi cu grosime diferită, care constituie materie primă pentru realizarea unor obiecte decorative.

În egală măsură, rezultatele analizelor tehnologice efectuate pe piesele de aur din necropola de la Varna indică fabricarea unora dintre obiecte din surse diferite de aur şi susţin posibilitatea stocării intermediare a aurului în lingouri, ulterior retopite şi turnate în forme pentru a obţine artefacte cu forme specifice (V. Leusch *et alii* 2014, p. 170-172) şi, probabil, de greutatea dorită. Spunem acest lucru pentru că sunt opinii care susţin că pe baza cântăririi aceloraşi piese din aur din necropola de la Varna au putut fi stabilite trei categorii de greutăţi, şi mai ales, existenţa unui sistem de măsurare a aurului cu două unităţi, în valoare de 0,14 g şi 0,41 g (R.I. Kostov 2008, p. 206), deşi acest sistem nu este vizibil la piesele de aur întâlnite în arealul nordic al culturii Kodjadermen-Gumelniţa-Karanovo VI.

Odată stabilit faptul că anumite categorii de artefacte gumelniţene erau lucrate din bare de secţiuni şi cu grosimi variabile, întrebarea următoare este dacă circulaţia aurul, în general, urma un schimb la distanţă, dacă există posibilitatea ca sârmele de aur descoperite în spaţiul nord-dunărean să provină de la sud de Dunăre. Pentru această direcţie de investigare au fost utilizate analizele compoziţionale.

◈ Analize spectrale efectuate asupra pieselor gumelniţene din aur

Rezultatele şi interpretările analizelor spectrale mai vechi, efectuate pe obiectele din tezaurul de la Hotnitsa şi din necropola de la Varna (A. Hartmann 1978, p. 31-35), au fost amendate sau infirmate. Recent a fost reluată problematica paleo-metalurgiei aurului, a provenienţei surselor de materie primă a pieselor de la sud de Dunăre, a tehnicilor de prelucrare etc. (K. Dimitrov 2013; V. Leusch *et alii* 2014; V. Leusch *et alii* 2015), completând studiile şi articolele al căror subiect l-a constituit originea materiei prime utilizate în realizarea artefactelor descoperite în situri nord-dunărene (R. Bugoi *et alii* 2003, p. 380-381; V. Cojocaru, D. Şerbănescu 2002, p. 86-87).

Multă vreme s-a crezut că în cazul pieselor din aur, ca şi în cazul altor categorii de obiecte, sursa de materie primă ar fi sudică, plasată în Thracia sau insula Thasos (E. Comşa 1974, p. 19-21). Ulterior, cercetătorii bulgari au identificat numeroase zone cu concentrări de zăcăminte aurifere de filon sau aluvionare, cum sunt cele din munţii Sarnena Gore, Rodopii de Vest, Balcani etc. (V. Mladevova *et alii* 2004, fig. 1, p. 424-426; M. Tonkova 2008, p. 266-267, fig. 1).

În anii 1990 analize efectuate pe unele artefacte din aur din necropola de la Varna indicau confecţionarea acestor obiecte din nisip aurifer (C. Eluère 1989, p. 69; C. Eluère, C.Y. Raub 1991a; C. Eluère, C.Y. Raub 1991b; Z.L. Tsintsov 1992), ceea ce a reorientat cercetările către sursele locale de materie primă, recent, această ipoteză fiind larg acceptată (K. Dimitrov 2013, p. 55-59; V. Leusch *et alii* 2014, p. 370-372; V. Leusch *et alii* 2015, p. 361-362). Rezultatele analizelor micro-PIXE efectuate pe produse descoperite în situri gumelniţene, cum sunt cele din tezaurul de la Sultana *Malul Roşu* sau din necropola de la Chirnogi *Şuviţa lui Ghiţan* au confirmat utilizarea nisipului aurifer (R. Bugoi *et alii* 2003, p. 379-381). Mai mult, s-a avansat posibilitatea ca măcar anumite obiecte să fi fost produse local, la nord de Dunăre, având în vedere existenţa unor documente medievale care atestă extragerea aurului din râuri ca Olt, Dâmboviţa etc. (R. Bugoi *et alii* 2003, p. 380), deşi sunt opinii care susţin o origine sud-dunăreană a materiei prime, datorită concentraţiei mari de plumb în componenţa unora dintre piese (V. Cojocaru, D. Şerbănescu 2002, p. 86).

Prezenţa la Bucşani a unor fragmente de vas în compoziţia cărora există nisip aurifer (C. Bem 2002, p. 169-170), sau la Vităneşti, a unor fragmente ceramice pictate cu aur (R.R. Andreescu *et alii 2009*, p. 76), descoperirea la Peştera Ungurească din Cheile Turzii a unui

atelier de prelucrare a aurului, unde perlele au fost lucrate prin suprapunerea de foiţe (Gh. Lazarovici *et alii* 2012, p. 4-5), asemănător pandantivului de la Vităneşti (R.R. Andreeescu *et alii* 2009, p. 79), au fost invocate drept argumente pentru susţinerea unei metalurgii locale a aurului (S. Oanţă-Marghitu 2013a, p. 38-39). Am adăuga şi faptul că incluziuni de tipul platinei şi elemente din grupa platinei, frecvent întâlnite în piesele din perioada Gumelniţa din spaţiul sud-dunărean (V. Leusch *et alii* 2014, tab. 1), nu sunt evidenţiate în analizele efectuate pe piesele din spaţiul nord-dunărean (R. Bugoi *et alii* 2003, tab. 1; V. Cojocaru, D. Şerbănescu 2002, tab. 1).

◈ Metoda XRF şi rezultatele analizelor efectuate asupra celor două sârme de aur

Cele două piese provenind din siturile de la Morteni şi Balaci au fost analizate elemental folosind flourescenţa de raze X (XRF). A fost utilizat un spectrometru portabil tip InnovX Systems Alpha Series dotat cu tub cu anod din W, cu detector SiPIN şi sistem de răcire prin efect Peltier, cu următorii parametri de lucru: tensiunea de 35 kV, intensitatea de 6 microA, iar timpul de achiziţie de 120 s.

Se consideră că metoda permite identificarea componentelor chimice majore din piesele de aur, Cu, Au, Fe, Pb sau Ag, Sn, Sb, în funcţie de sursa de excitare izotopică cu Pb sau Am (B. Constantinescu *et alii* 2003-2005, p. 390). Prezintă o sensibilitate mai redusă faţă de alte metode de analiză cu ajutorul raxelor X pentru că permite doar analiza stratului de suprafaţă al obiectului (câteva zeci de microni) şi nu percepe elementele chimice sub 0,1%. Cu toate acestea, a condus la determinarea elementelor urmă care să lege artefactele de sursa de materie primă, fapt confirmat prin alte metode (D. Cristea 2012, p. 15).

Alţi cercetători consideră ca această metodă analitică oferă doar posibilitatea urmăririi unor producţii de serie presupuse a exista pe baza criteriilor tipologice prin clasificarea obiectelor de aur dintr-un lot în grupe compoziţionale principlale (V. Leusch *et alii* 2014, p. 169, 173-174, 178; V. Leusch *et alii* 2015, p. 367-368) şi, în egală măsură, constituie punct de plecare pentru înţelegerea etapelor şi gesturilor implicate în paleo-metalurgia aurului (topirea, utilizarea sintezei aliajelor pentru obţinerea anumitor culori, retopirea etc.) (V. Leusch *et alii* 2015, p. 356-359).

Rezultatele analizelor FRX efectuate pe cele două sârme indică procente similare de aur (91-92 %) şi argint (7-8 %) şi prezenţa aceloraşi oligoelemente (fier, nichel, cupru) (tab. 1).

Compoziţia chimică a celor două piese gumelniţene este comparabilă cu cele realizate pe obiecte din aur din spaţiul gumelniţean nord-dunărean, investigate prin ED-XRF (energy-disperse X-ray fluorescence) (V. Cojocaru, D. Şerbănescu 2002, p. 86, tab. 1) sau prin micro-PIXE (R. Bugoi *et alii* 2003, tab. 1), sau cu cele realizate prin metoda FRX pentru piese eneolitice, din mediul Gumelniţa sau Bodrogkeresztúr (Gh. Lazarovici *et alii* 2012, tab. 16). De asemenea, remarcăm asemănarea structurii chimice a pieselor de la Morteni şi Balaci cu cea a verigilor individuale din sârmă de secţiune circulară descoperite în *tell*-ul de la Hotnitsa (tab. 2), dar şi diferenţele faţă de compoziţia chimică a piesele de aur de la Varna, care prezintă concentraţii mai mari de argint şi cupru (V. Leusch *et alii* 2014, p. 177).

Nr. crt.	Loc descoperire	Au (%)	Ag (%)	Cu (%)	Fe (%)	Ni (%)	Pb (%)	Greut. (g)	Dimens. (mm)
1.	Morteni	92,49	7,37	0,001	0,14	0,001	0,001	10,78	L = 125,3
2.	Balaci	91,75	8,16	0,001	0,09	0,001	-	10,50	L = 124

Tab. 1. Compoziţia chimică a pieselor de la Morteni şi Balaci.
The chemical composition of gold artifacts from Morteni and Balaci.

Elem. ch./Sit	Fe %	Cu %	Zn %	As %	Ag %	Sn %	Sb %	Au %	Pb %	Hg %	Greut. (g)	Dimens. (mm)
H.n4	0,28	1,09	<0,01	<0,01	3,21	<0,01	<0,01	95,42	<0,01	<0,01		L = 122
H.n1		x			>4			>96			4,5	L = 87

Tab. 2. Compoziţia chimică a două spirale de la Hotnica (după A. Chohadzhiev 2009, fig. 21 şi S. Chokhadzhiev, A. Chokhadzhiev, 2005, p. 12, fig. 8).
The chemical composition of two golden spirals from Hotnica (after A. Chohadzhiev 2009, fig. 21 and S. Chokhadzhiev, A. Chokhadzhiev, 2005, p. 12, fig. 8).

◈ Concluzii

Deşi se acceptă că materia primă utilizată pentru realizarea pieselor din aur a fost extrasă din nisipurile aurifere, atât în eneolitic, cât şi în epoca bronzului (R. Bugoi *et alii* 2003, p. 380-381; V. Cojocaru, D. Şerbănescu 2002, p. 86; Fl. Gogâltan 1998, p. 14-15; V. Leusch *et alii* 2014; V. Slavchev 2011, p. 201; Z.L. Tsintsov *et alii* 2009, p. 10), sunt încă discuţii privind relevanţa diferitelor metode de analiză chimice, fizice şi statistice folosite pentru a evidenţia ariile sursă de materie primă având în vedere, pe de-o parte procesele chimice pe care le suportă metalul în procesul tehnologic de transformare în obiecte finite, iar pe de altă parte diferenţele compoziţionale oferite de sursele locale de materie primă şi accesibilitatea diferitelor metode atomice şi nucleare utilizate în obţinerea structurii elementale a pieselor (R. Bugoi *et alii* 2003, p. 375, 379-381; V. Leusch *et alii* 2014, p. 170-172; 2015, p. 356, 362; Ch.D. Standish *et alii* 2015, p. 4-10).

Remarcăm doar faptul că analizele compoziţionale, deşi uneori sunt realizate prin aceleaşi metode, sugerează existenţa unor surse de aur diferite pentru piesele decoperite la nord sau la sud de Dunăre, sau chiar în interiorul celor două areale. Sursele de la sud de Dunăre conţin paladiu şi elemente din această grupă (elementele PGE) (K. Dimitrov 2013, p. 56-59; V. Leusch *et alii* 2014, 170-172), iar cele de la nord de Dunăre au alte elemente chimice urmă, cum ar fi staniu, stibiu, zirconiu, fier, titan, calciu (R. Bugoi *et alii* 2003, p. 375, 379-381; D. Cristea 2012, p.15, 47-48). Pentru alte paliere culturale şi cronologice, pentru a obţine informaţii asupra originii aurului din artefacte au fost utilizate semnăturile particulare ale unei zone geologice obţinute prin analiza izotopilor de plumb din aur, dar şi din alte minerale (S. Baron *et alii* 2011; Ch. Standish *et alii* 2013; Ch.D. Standish *et alii* 2015, p. 4-10).

În ceea ce privește modul de fabricare a pieselor din aur, constatăm că studiile asupra obiectelor descoperite în mediul gumelniţean sud-dunărean susţin procedeul turnării în formă și prin metoda cerii pierdute (K. Dimitrov 2013, p. 59, 62, 64, 66; V. Leusch *et alii*. 2014, p. 174-176), în timp ce studiile dedicate analizelor pieselor preistorice de aur din spaţiul de la nord

de Dunăre susţin utilizarea ciocănirii la rece şi sudarea la cald (D. Cristea 2012, p. 16-17, 47; Gh. Lazarovici *et alii* 2012, p. 4).

Având în vedere toate aceste diferenţe considerăm că mai sunt mulţi paşi de urmat spre o mai bună înţelegere a aspectelor legate de originea surselor de materie primă, de pirotehnologia aurului sau despre formele şi modalităţile de circulaţie a acestui metal în preistorie.

◈ Bibliografie

R.R. Andreescu *et alii* 2009	R.R. Andreescu, P. Mirea, K. Moldoveanu, I. Torcică, Noi descoperiri în aşezarea gumelniţeană de la Vităneşti Măgurice, *BMJT*, 1, p. 75-93.
D.W. Bailey 2000	*The Balkan Prehistory. Exclusion, Incorporation and Identity*, Routledge, London and New York.
S. Baron *et alii* 2011	S. Baron, C.G. Tămaş, C. Camuet, M. Munoz, Lead isotope analyses of gold-silver ore from Roşia Montană (Romania): a first step of a metal provenance study of Roman mining activity in Alburnus Maior (Roman Dacia), *JAS*, 38 (5), p. 1090-1100.
C. Bem 2002	A special Type of Aeneolithic Dwelling. Unicum or Deficiency of Conservation?, *SP*, I, p. 153-193.
R. Bugoi *et alii* 2003	R. Bugoi, V. Cojocaru, B. Constantinescu, D. Grambole, F. Herrmann, Micro-PIXE study of gold archaeological objects, *Journal of Radioanalytical and Nuclear Chemestry*, 257 (2), p. 375-383.
D. Cernakov 2011	Newly descovered Chalcholthic necropolis near Kosharna tell, in S. Mills, P. Mirea (eds.), *The Lower Danube in Prehistory: Landscape Changes and Human-Environment Interactions*, Poceedings of the International Conferance, Alexandria, 3-5 November 2010, Ed. Renaissance, Bucureşti, p. 117-131.
D. Cernakov, D. Dilov 2014	Chalcolithic necropolis at the village of Kamenovo, Razgrad district, Kubrat municipality: Unpublished finds, *Pontica*, XLVII, p. 153-161.
D. Chernakov 2009	*Rousse tell.* Catalog, Ruse Museum, Ruse.
A. Chohadzhiev 2009	The Hotnitza tell - 50 years later. Eight years of the new excavations – some results and perspectives, in F. Drasovean, D.L. Ciobotaru, M. Madison (eds.), *Ten years after: the Neolithic of the Balkans, as uncovered by the last decade of research*, Timişoara, p.67-84.

S. Chohadzhiev 2010 — Zlatoto ot Hotnica v kontecsta na halkolitnoto zlato ot Iogoiztočna Evropa, *Velikotârnovskiat Universitet "Sv. Sv. Kiril i Metodi" I Bălgarskata Arheologia*, Universitetsko Izdatelsko "Sv. Sv. Kiril i Metodi" Veliko Târnovo, p. 87-93.

S. Chokhadzhiev, A. Chokhadziev 2005 — Some Results of the Investigation of Hotnitza Tell in 2001, în L. Nicolova, J. Higgins (eds.), *Prehistoric Archaeology and Anthropological Theory and Education*, Report on Prehistoric Research Projects, 5-6, p. 9-12.

V. Cojocaru, D. Şerbănescu 2002 — Nuclear Analysis of Some Eneolithic Gold Artifacts Discovered in the Călăraşi District, Romania, *Thraco-Dacica*, XXIII (1-2), p. 85-91.

E. Comşa 1974 — Date despre folosirea aurului în cursul epocii neolitice pe teritoriul României, *Apulum*, XII, p.13-22.

E. Comşa 1995 — Necropola gumelniţeană de la Vărăşti, *AnB*, IV, p. 55-193.

B. Constantinescu *et alii* 2003–2005 — B. Constantinescu, V. Cojocaru, R. Bugoi, Spre o abordare cât mai obiectivă în cercetarea numismatică prin analize compoziţionale folosind metode nucleare, *Cercetări Numismatice*, 9-11, p. 389–404.

D. Cristea 2012 — *Studiul aurului din România în vederea stabiliriii provenienţei obiectelor arheologice din patrimoniul cultural naţional*, rezumatul tezei de doctorat susţinute în cadrul Universităţii Bucureşti, Facultatea de Geologie şi Geofizică.

P. Diaconescu 1978-1979 — Cercetări arheologice în bazinul mijlociu al Argeşului. Aşezarea eneolitică de la Morteni, jud. Dîmboviţa, *Valachica. Studii şi Cercetări de Istorie*, 10-11, p. 97-113.

K. Dimitrov 2002 — Die Metallfunde aus den Gräberfeldern von Durankulak, in H. Todorova (ed.), *Durankulak, band II. Die Prähistorischen Gräberfelder*, Sofia, p. 127-158.

K. Dimitrov 2013 — Tehnological Developement of the Goldworking Techniques in Varna, în H. Angelova, M. Özdoğan (eds.), *Where are the sites? Research, Protection and Managenet of Cultural Heritage*, 5-8 December 2013, Ahtopol, Center for Underwater Archaeology, Sozopol, p. 53-80.

S. Dolinescu-Ferche 1963 — Podoabe de aur descoperite la Balaci (r. Roşiorii de Vede), *SCIV*, XIV (1), p. 183-188.

Vl. Dumitrescu 1924 — Découvertes de Gumelniţa, *Dacia*, I, p. 325-342.

C. Eluère 1989 — L'or de Varna, in *Le premier or de l'humanité en Bulgarie. 5e millénaire*. Catalog de expoziţie, Musée des antiquités nationales, Paris, p. 61-69.

C. Eluère, C.Y. Raub 1991a — New investigation on Early Gold Foil Manufacture, în E. Pernika, G.A. Wagner (eds.), *Archaeometry'90. International Symposium on Archaeometry*, 2-6 April, 1990, Heidelberg, p. 45-54.

C. Eluère, C.Y. Raub 1991b — Investigation on Gold Coating Technology of the Great Dish from Varna, în C. Eluére, J.P. Mohen (eds.), *Découvert du metal*, Paris, p. 13-30.

B. Gaydarska, J. Chapman 2008 — The aesthtics of coulor and brilliance – or why were prehistoric persons interested in rocks, minerals, clay and pigments?, în R.I. Kostov, B. Gaydarska, M. Gurova (eds.), *Geoarchaeology and Archaeolomineralogy, Proceeding of the International Conferance, 29-30 oct. Sofia*, Sofia, p. 63-66.

G.I. Georgiev 1978 — Das Spätchalkolithikum in Bulgarien im Lichte der neuesten archäologischen Untersuchungen, *StudPraeh*, 1-2, p. 68-78.

D. Gheorghiu 2012 — 'Skeuomorphs': on the rhetoric of material in the Gumelniţa traditions, *DocPraeh*, XXXIX, p. 287-294.

Fl. Gogâltan 1998 — Bronzul timpuriu şi mijlociu în Banat. Metalurgia aurului, *Ephemeris Napocensis*, VIII, p. 13-34.

A. Hartmann 1978 — Ergebnisse der spektralanalytischen Untersuchung äneolithischer Goldfunde aus Bulgarien, *StudPraeh*, 1-2, p. 27-45.

C. Hălcescu 1995 — Tezaurul de la Sultana, *CCDJ*, XII-XIV, p. 11-18.

A. Ilie 2013 — Sârmă de aur, Morteni-Măgura, jud. Dâmboviţa, în R. Oanţă-Marghitu (ed.) *Aurul şi argintul antic al României* (Catalog de expoziţie), Muzeul Naţional de Istorie a României, Bucureşti, p. 175.

I.S. Ivanov 1978 — Les fouilles archeologiques de la nécropole chalcolithique à Varna (1972-1975), *StudPraeh*, 1-2, Sofia, p. 13-26.

I. Ivanov 1988 — Das Gräberfeld von Varna –Katalog, în A. Fol, J. Lichardus (eds.), *Macht, Herrschaft und Gold: das Gräberfeld von Varna (Bulgarien) und die Anfänge einer neuen europäischen Zivilisation*, Saarbrücher: Modern Gallerie des Saarland Museums, 1988, p. 183-208.

T. Ivanov, D. Dilov 2011 — A Chalcolithic Necropolis at the Radingrad Tell, *Известия - Пространства на Дунавската цивилизация*, Известия на Регионален исторически музей – Русе/Izvestia na Istoricheskia musea – Russe, XIV, p. 132-145.

F. Klimscha 2014 — Power and prestige in the Copper Age of the Lower Danube, în C.E. Ştefan, M. Florea, S.C. Ailincăi, C. Micu (eds.), *Studii privind preistoria sud-estului Europei*, Ed. Istros, Brăila, p. 131-168.

R.I. Kostov 2008 — Precios and decorative minerals from the Eneolithic necropoli in Northeastern Bulgaria and their significance in the history of Gemmology, *The 80th Anniersary of Bulgarian Geological Society*, p. 205-208.

Gh. Lazarovici *et alii* 2012 — Gh. Lazarovici, C.M. Lazarovici, B. Constantinescu, Despre analizele pieselor de aur din atelierul de bijuterii de la Cheile Turzii – Peştera Caprelor/Peştera Unguresacă, *Apulum*, XLIX, p. 1-12.

C. Lazăr 2011 — A Review of Gumelniţa Cemeteries from Romania, *Известия - Пространства на Дунавската цивилизация*, Известия на Регионален исторически музей – Pyce/Izvestia na Istoricheskia musea – Russe, XIV, p. 146-157.

D. Leahu 1992 — Consideraţii asupra unor podoabe antice de aur de la Lungoci, Balaci şi Moigrad, *CA*, IX, p. 114-117.

V. Leusch *et alii* 2014 — V. Leusch, E. Pernicka, B. Armbruster, Chalcolithic Gold from Varna – Provenance, Circulation, Processing, and Functional, în H. Meller, R. Risch, E. Pernicka (eds.), *Metalle der Macht – Frühes Gold und Silber/Metals of power – Early gold and silver*, 6. Mitteldeutscher Archäologentag von 17, Bis 19, Oktober 2013 in Halle (Saale), p. 165-182.

V. Leuche *et alii* 2015 — V. Leusch, B. Armbruster, E. Pernicka, V. Slavčev, On the Invention of Gold Metallurgy: The Gold Objects from the Varna I Cemetery (Bulgaria) – Technological Consequence and Inventive Creativity, *Cambridge Archaeological Journal*, 25 (1), p. 353-376.

V. Mladevova *et alii* 2004 — V. Mladenova, T. Kerestedjian, D. Dimitrova, The Balkan Mountains Paleozoic Gold Deposits, *Buletin of the Geological Society of Greece,* XXVI, p. 424-433.

S. Oanţă-Marghitu 2013a — Despre obiectele de aur din eneoliticul sud-est european, în R. Oanţă-Marghitu (ed.), *Aurul şi argintul antic al României.* Catalog de expoziţie, Muzeul Naţional de Istorie a României, Bucureşti, p. 36-47.

S. Oanţă-Marghitu 2013b — Tezaurul de la Balaci-Măgură, jud. Teleorman, în R. Oanţă-Marghitu (ed.), *Aurul şi argintul antic al României*. Catalog de expoziţie, Muzeul Naţional de Istorie a României, Bucureşti, p. 176.

A. Radunčeva 1976	Vinica. Eneolitno selište i nekropol, *Razkopki i proučvanija*, 6, Bălgarska Akademija na Naukite.
V. Slavchev 2011	The Varna Eneolithic cemetery in the context of the Late Copper Age in the East Balkans, în D.W. Anthony, J.Y. Chi (eds.), *The Lost World of Old Europe. The Danube Valley 5000-3500*. Catalog de expoziţie, The Institute for the Study of Ancient World, Princeton University Press, Princeton, p. 192-211.
Ch. Standish *et alii* 2013	Ch. Standish, B. Dhuime, R. Chapman, C. Coath, C. Hawkesworth, Al. Pike, Solution and laser ablation MC-ICP-MS lead isotope analysis of gold, *Journal of Analytical Atomic Spectrometry*, 28 (2), p. 217-221.
Ch.D. Standish *et alii* 2015	Ch.D. Standish, B. Dhuime, Ch.Y. Hawkesworth, Al.W.G. Pike, A non-local source of Irish Chalcolithic and Early Bronze Age Gold, *Proceedings of the Prehistoric Society*, doi:10.1017/ppr.201.4, p. 1-29.
D. Şerbănescu 2013	Tezaurul de la Sultana-Malu Roşu, jud. Călăraşi, în R. Oanţă-Marghitu (ed.), *Aurul şi argintul antic al României*. Catalog de expoziţie, Muzeul Naţional de Istorie a României, Bucureşti, p. 173.
C.E. Ştefan 2008	Some observations on the Vidra type axe. The social significance of copper in the Chalcolithic, *SP*, 5, p. 78-88.
H. Todorova 1975	Arheologičesko proučvane na selištnata mogila i nekropola pri Goljamo Delčevo, *Razkopki i proučvanija*, 5, Bălgarska Akademija na Naukite.
H. Todorova-Simeonova 1971	Kasnoeneolitnijat nekropol krai grad Devnja - varnensko, *Izvestia na Narodniya Muzeji Varna*, 7 (22), p. 3-40.
H. Todorova, I. Vajsov 2001	*Der Kupferzeitliche Schmuck Bulgariens*, Prähistoriche Bronzefunde, XX (6), Fr. Steiner Verlag: Stuttgart.
M. Tonkova 2008	Archaeological evidence for the exploitation of the gold ore deposits at the village of Kolio Malinovo (Sarnena Gora Mountain) and Babyak (Westhern Rodopes) in Antiquity, în R.I. Kostov, B. Gaydarska, M. Gurova (eds.), *Geoarchaeology and Archaeomineralogy. Proceedings of the international conference*, 28-30 October 2008 Sofia, Ed. St. Ivan Rilski, Sofia, p. 266-270.
Z.L. Tsintsov 1992	Unique finds of golden articles in alluvial placers in Bulgaria, *Comptes rendus de l'Académie bulgare des Sciences*, 45 (6), p. 59-61.

Z. Tsintsov *et alii* 2009 — Z. Tsintsov, M. Hristov, V. Karatsanova, S. Tsanevo, Preliminary Results from the Study of Early Bronze Age Golden Artefacts from Ritual Structures by the Village of Dubene, Kolova District, South Bulgaria, *ArchB*, XIII (3), p. 7-21.

A. Vulpe 1973 — Începuturile metalurgiei aramei în spaţiul carpato-dunărean, *SCIV*, 24 (4), p. 217-237.

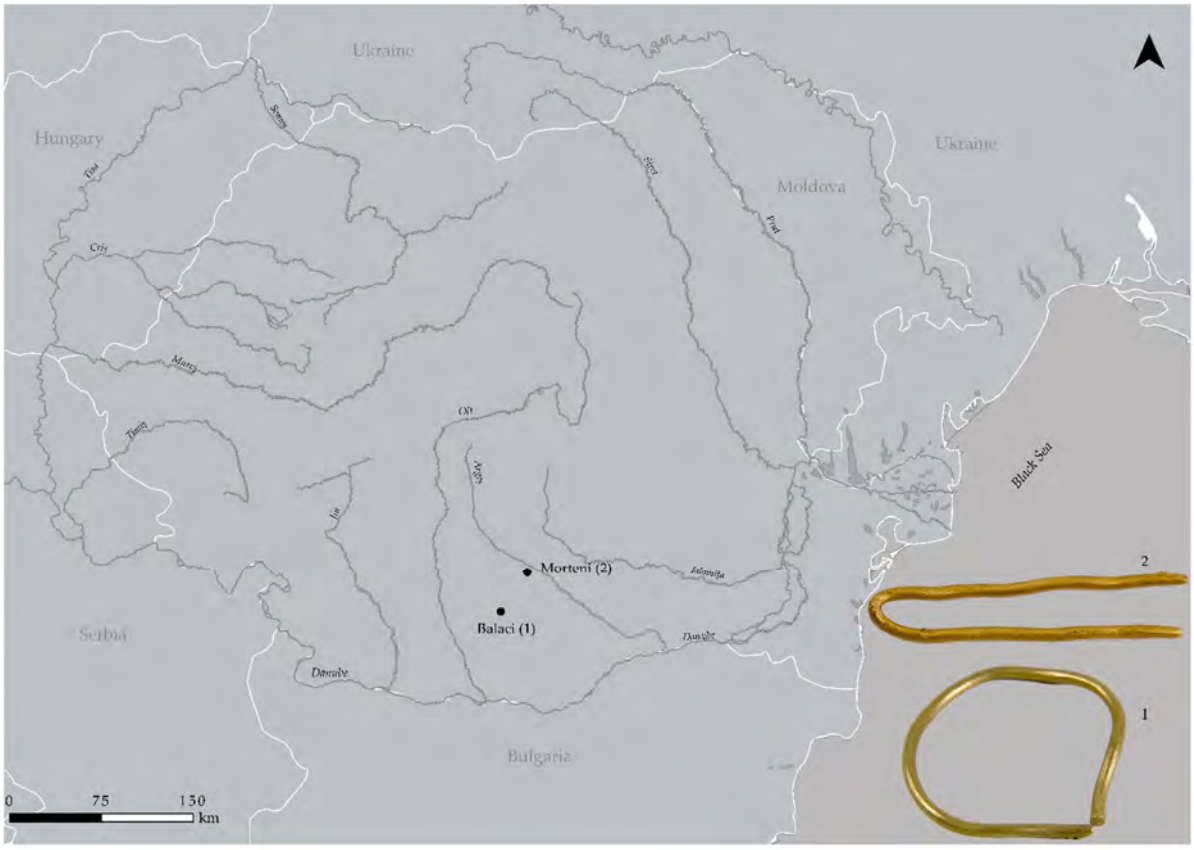

Fig. 1. Sârmele de aur din aşezările gumelniţene de la Morteni, jud. Dâmboviţa şi Balaci, jud. Teleorman (foto M. Amarie, MNIR, fără scară).
Fig. 1. The gold wires from Gumelniţa Settlements of Morteni, Dâmboviţa County and Balaci, Teleorman County, (photo M. Amarie, MNIR, no scale).

Technology and functionality of the quadrilobed Wietenberg vessel

Mădălina VOICU*

Abstract: *The late phases of the Middle Bronze Age Wietenberg culture are characterized by the predominance of good quality and carefully decorated pottery. One of the most remarkable pottery products of this period is the so-called quadrilobed vessel, a lavishly decorated high quality product. The vessel has an odd, lobed shape, not immediately readable in terms of functionality. In addition to its esthetic and technical features, it is also a rare find: it constitutes a small proportion of the pottery discovered in settlements, being even rarely associated to funerary contexts. Although the quadrilobed vessel has received a certain academic attention, it was invariably analyzed as individual find. This paper discusses several recently discovered quadrilobed vessels at the Pianu de Jos – Lunca Pârâului settlement. By using statistical tools, micro- and macroscopic analysis, it will consider the functionality of such vessels, with a focus on the technological and morphological characteristics of the pottery found at Pianu de Jos – Lunca Pârâului site, on the Mureș valley.*

Rezumat: *Fazele finale ale culturii Wietenberg (epoca bronzului mijlociu, Transilvania) se caracterizează prin prezența predominantă a unei ceramicii de bună calitate, decorată cu mare atenție. Unul dintre produsele ceramice remarcabile pentru această perioadă este așa-numitul vas cvadrilobat, un produs de înaltă calitate, bogat decorat. Vasul are o formă neobișnuită ce nu dezvăluie la o primă vedere informații în ceea ce privește funcționalitatea sa. Exceptând caracteristicile tehnice și estetice, acest tip de vas este de asemenea o descoperire rară: constituie o mică parte din ceramica descoperită în așezări, fiind chiar foarte rar asociat cu contexte funerare. Deși vasele cvadrilobate au stat într-o anumită măsură în atenția cercetătorilor, au fost invariabil analizate ca descoperiri individuale. Această lucrare discută descoperirile de vase cvadrilobate din situl de epoca bronzului de la Pianu de Jos - Lunca Pârâului. Prin utilizarea instrumentelor statistice, a analizelor micro și macroscopice, studiul urmărește funcționalitatea acestora, cu accent pe caracteristicile tehnologice și morfologice ale exemplarelor de la Pianu de Jos - Lunca Pârâului, pe valea Mureșului.*

Keywords: *Middle Bronze Age, Wietenberg, pottery, quadrilobed vessels.*

Cuvinte cheie: *bronz mijlociu, Wietenberg, ceramică, vase cvadrilobate.*

◈ Introduction

This study aims to determine the functionality of a particular pottery type, the quadrilobed vessel, belonging to the Middle Bronze Age Wietenberg style. As a case study, I chose to examine in a detailed manner all the specimens discovered at the Pianu de Jos - *Lunca Pârâului* site. The ceramic studies dealing with the Middle Bronze Age in the Carpathian basin are not entirely rare but often lack in quantitative assessments, focusing on selections of material. In contrast, this analysis of the quadrilobed vessels represents only a small part of a more detailed study on the entire assemblage of Middle Bronze Age ceramics discovered at Pianu de Jos - *Lunca Pârâului* site.

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◈ The assemblage

The Wietenberg pottery style emerges in the Transilvanian plateau as a dominant Middle Bronze Age material culture. The material culture consists of short-term settlements, cremation graves in relatively small cemeteries and intricate pottery decorations - a wide variety of repetitive spiral and meander motifs.

The few, namely six radiocarbon dates range between 1950 and 1400 BC, falling into the general chronology of the Middle Bronze Age in Romania, which is 2200-1500 BC (Al. Vulpe 2010). The internal periodization of the so - called "Wietenberg culture" is also quite a problematic topic still debated. Some researchers recognize three phases of evolution (K. Horedt 1967; N. Chidioşan 1968) while others have observed four (N. Chidioşan 1974; I. Andriţoiu 1978; N. Borrofka 1994). Based on a series of stratigraphic considerations, this study has adopted the division into four phases of evolution.

The core sample for the analysis of the quadrilobed type Wietenberg vessels (fig. 1) consists of the discoveries from Pianu de Jos - *Lunca Pârâului* site (P. Damian *et alii* 2013), excavated in 2012 during the construction of road infrastructure along the Pan - European Corridor IV (A1 Highway Orăştie - Sibiu, section 1 Orăștie - Sebeș). The site is located on the left terrace of the Pianu creek (tributary of the river Mureș), downstream, at about 600 m from the Sibişeni village. It occupies an area of over 2.5 hectares. Preventive archaeological research have documented the existence of both habitation features (two surface dwellings, fireplaces, outdoor platforms made of river stones and pits) and a series of cremation and inhumation graves, dated to the Bronze Age.

So far, the results of the archaeological field research were only minimally published in the excavation report. The analysis of all Bronze Age features and material assemblages constitute the Ph.D. subject of this article's author.

◈ Analysis of the quadrilobed vessels from Pianu de Jos – *Lunca Pârâului*

Following the primary statistical analysis carried out on the entire assemblage of ceramic material, I observed that the presence of the quadrilobed vessels was of only 2%. This small percentage shows that this particular type can be regarded as a rare find: from over 1500 determinable forms, I identified only 38 fragments and parts of the aforementioned vessel. Concerning the fabric of which they were produced, based on microscopic analysis (x20), the quadrilobed vessels are always part of the fine ware category without exception. The fabric contains inclusions (P.M. Rice 1987, 411-413) of fine and medium sand with dimensions of less than 1.5 mm. These inclusions are sparse (3-7%), subangular-subrounded (SA/SR) according to the guidelines provided by the Prehistoric Ceramics Research Group (PCRG 2010). Also, the fabric is not easily scratched, it has a smooth texture, and the fracture breaks are fine-irregular.

For the construction of these vessels with obviously a less common form (N. Boroffka 1994, type TE1c, p. 157; L. Dietrich 2014, B5, p. 53), the technique called *au columbin* has been used. On a flat round base were overlapped clay coils with varying diameters. This technique is visible due to the fracture of the fragments in a straight line along the interfaces and in a few cases of slight variations in the thickness of the walls. Always four in number, the lobes were constructed starting from the maximum diameter of the vessel, both in horizontal position reducing their size to the top, and in an inclined position, increasing their size to the top (fig. 2).

Before finishing, the vessel surfaces were cleaned by scraping with a sharp tool. In general, both the inside and outside surfaces were burnished by rubbing it with hard tools before it was completely dry. This type of treatment is generally performed for a variety of reasons, including exposure / display, as a glossy surface is more pleasant. Also, the burnished surface becomes to a certain degree impermeable (J.M. Skibo 1992, p. 32). Only five of the 38 fragments show smoothened surfaces, most likely made by hand or with a piece of fabric or leather, acquiring a matte wall.

The techniques used to decorate the quadrilobed vessels are incision and impression. Half of the studied samples are decorated with three bands rising to the top of the lobes and descending slightly to a maximum diameter (fig. 3), made with sharp incisions with triangular section. Visually quite remarkable are the vessels decorated with meander or spiral motifs, which combine incised triangles with bands filled with simultaneous impressed dots (fig. 4). Only two pottery fragments come from pots decorated with oblique groove and impressions. Specific for this type of vessel are the wide bands of shaded or incised triangles, positioned vertically from the base of the vessel by the maximum diameter, where they meet the horizontal decoration. The only vessel with a profile presents such a decoration, and in the area between the vertical bands were placed circles made up of three incised lines inside with two rows of other incised lines positioned in the shape of a cross (N. Boroffka 1994, typ. 18, 19). The two X-ray fluorescence analysis (XRF) made on what could be considered as encrusted white paste actually showed the presence of a natural soil residue.

The process of firing occurred in both oxidizing and unoxidizing environment (B. Velde, I.C. Druc 1998, p. 122-126). Colours vary from black and gray to different shades of brown. Traces of burning, blackened areas are often visible on the surface of fragments, but their interpretation remains uncertain - this could be a consequence of the position of the pots during firing or it may suggest their use directly over the fire. Also the fact that two shards of the same vessel show totally different colours indicates a pre-abandonment breakage.

Another important remark, also observed through macroscopic analysis is that the only two bottom shards of the entire assemblage show no visible traces of use.

Excepting the morphological performance, the analysis of function and use relies also on the characteristics of the archaeological context. The 38 fragments of quadrilobed vessels from Pianu de Jos - *Lunca Pârâului* were discovered exclusively in pits (features no. 18, 35, 37, 71, 99, 100, 112, 116, 129, 142, 181, 211, 216, 238, 243, and two passim) in association with a variety of ceramic forms. However, this is not a valid situation for other sites; for example, there are some cases in which the actual use of a quadrilobed vessel is that of a lid serving to cover a funerary urn (I.H. Crișan 1970, fig. 6, p. 140).

◈ Conclusions and perspectives

Most likely, this type of vessel functioned as a container for various solid or liquid offerings, being used during ceremonies or social events. As well, these pots might be linked to particular users, performing a role as displayer of identity and status.

Along with the form, decoration and surface treatment, all the other features – size, capacity/volume, content accessibility (it provides relatively easy access to the contents), stability (the bottom size is small when comparing to the maximum diameter and shape of the vessel) and transportability – suggest among other things, an occasional use of this type of vessel. Moreover, the degree of complexity in terms of manufacturing technology of such a ceramic container is very high, which suggests the action of an experienced potter. As a

community member, the potter combines rules and relevant variables in the whole process of producing such a vessel. His or her decisions are guided by technological traditions on how it should be made, how it should look and the purpose it should serve. The action of producing a quadrilobed vessel is very demanding. It requires a set of special skills for constructing thin walls without large variations in thickness, the curved lobes and a complex decoration free of retouches, which is not always available in case of an apprentice (S. Budden, J. Sofaer 2009, p. 207). Most probably, the quadrilobed Wietenberg vessels are the products of experienced potters who had a high degree of technical non-discursive knowledge (Ibidem), capable of mastering complex shapes and intricate decorations to a high standard. Also, their distinctive competences could ensure the continuity of production of distinguished objects.

To conclude, considering the existing arguments regarding the relationship between the fine ware and a dominant need to express identity and status in the Bronze Age (S. Budden 2008, K. Michelaki 2008, T. Earle et al. 2011, p. 428), it is likely that the manufacture of the quadrilobed Wietenberg vessel could be related to a specialized production of "prestige" objects, possibly involved in confirming and strengthening the social status, at least visually.

The analysis of this type of vessel and of the entire ceramics assemblage from Pianu de Jos – *Lunca Pârâului* site is a work in progress. Therefore, a number of questions related to the technical knowledge required in manufacturing, but also the source of raw materials and the contents of vessels are still waiting for an answer.

* * *

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◈ References

I. Andriţoiu 1978 — Cimitirul de incineraţie din epoca bronzului de la Deva, *SCIVA*, 29, 2, p. 241-256.

N. Boroffka 1994 — Die Wietenberg-Kultur. Ein Beitrag zur Erforschung der Bronzezeit in Südosteuropa, *Universitätsforschungen zur Prähistorischen Archäologie* 19, Dr. Rudolf Habelt GmbH, Bonn.

S. Budden, J. Sofaer 2009 — Non-discursive Knowledge and the construction of identity Potters, Potting and Performance at the Bronze Age Tell of Százhalombatta, Hungary, *Cambridge Archaeological Journal*, 19, 02, p. 203-220.

S. Budden 2008 — Skill among the Sherds: Understanding the Role of Skill in the Early to Late Middle Bronze Age in Hungary, in I. Berg (ed.) *Breaking the Mould: Challenging the Past through Pottery*, BAR (IS), 1861, p. 1–17.

N. Chidioșan 1968	Beiträge zur Kenntnis der Wietenbergkultur im Lichte der neuen Funde von Derșida, *Dacia (NS)*, XII, p. 155-175.
N. Chidioșan 1974	Sincronisme apusene ale culturii Wietenberg stabilite pe baza importurilor ceramice, *Crisia*, IV, 1974, p. 153-170.
I.H. Crişan 1970	Necropola de incineraţie aparţinînd culturii Wietenberg-Sighişoara, de la Bistriţa, *Materiale*, 9, p. 137-160.
P. Damian *et alii* 2013	P. Damian, I. Bocan, D. Vleja, M. Voicu, C. Cristescu, C.D. Țuțuianu, Pianu de Jos, com. Pianu, jud. Alba, punct: Lunca Pârâului (Autostrada Orăştie–Sibiu, lot 1, Sit 9, km 20+550–20+870) raport de cercetare preventivă, *Cronica*, *Campania 2012*, p. 223-224.
L. Dietrich 2014	*Die Mittlere und späte Bronzezeit und die ältere Eisenzeit in Südostsiebenbürgen aufgrund der Siedlung von Rotbav*, Universitätsforschungen zur Prähistorischen Archäologie, 248, Dr. Rudolf Habelt GmbH, Bonn.
T. Earle *et alii* 2011	T. Earle, A. Kreiter, C. Klehm, J. Ferguson, M. Vicze, Bronze Age Ceramic Economy: The Benta Valley, Hungary, *EJA*, 14, 3, p. 419-440.
K. Horedt 1967	Problemele ceramicii din perioada Bronzului evoluat în Transilvania, *Studii și Comunicări*, 13, p. 137-156.
K. Michelaki 2008	Making pots and potters in the Bronze Age Maros villages of Kizombor-Új-Élet and Klárafalva-Hajdova, *Cambridge Archaeological Journal*, 18, p. 355–380.
PCRG 2010	Prehistoric Ceramics Research Group 2010, *The study of prehistoric pottery: general policies and guidelines for analysis and publication*, Occasional Papers, No 1-2, 3rd edition.
P.M. Rice 1987	*Pottery Analysis. A Sourcebook*, University of Chicago Press, Chicago and London.
J.M. Skibo 1992	Ethnoarchaeology, experimental archaeology and inference building in ceramic research, *Archaeologia Polona*, 30, p. 27-38.
V. Velde, I.C. Druc 1998	*Archaeological Ceramic Materials. Origin and utilization*, Springer Verlag, Berlin.
Al. Vulpe 2010	Bronzul timpuriu, in M. Petrescu-Dâmboviţa, Al. Vulpe (eds.), *Istoria românilor. Vol I. Moştenirea timpurilor îndepărtate*, Ed. Enciclopedică, Bucureşti, p. 216-220.

Fig. 1. Quadrilobed Wietenberg vessels from Pianu de Jos – *Lunca Pârâului.*
Vase cvadrilobate Wietenberg de la Pianu de Jos – *Lunca Pârâului.*

Fig. 2. Fractures of the lobes showing the construction techniques.
Fracturi ale lobilor ce indică tehnicile de modelare.

Fig. 3. Decoration techniques: incision and channeling.
Tehnici de decor: incizie și canelură.

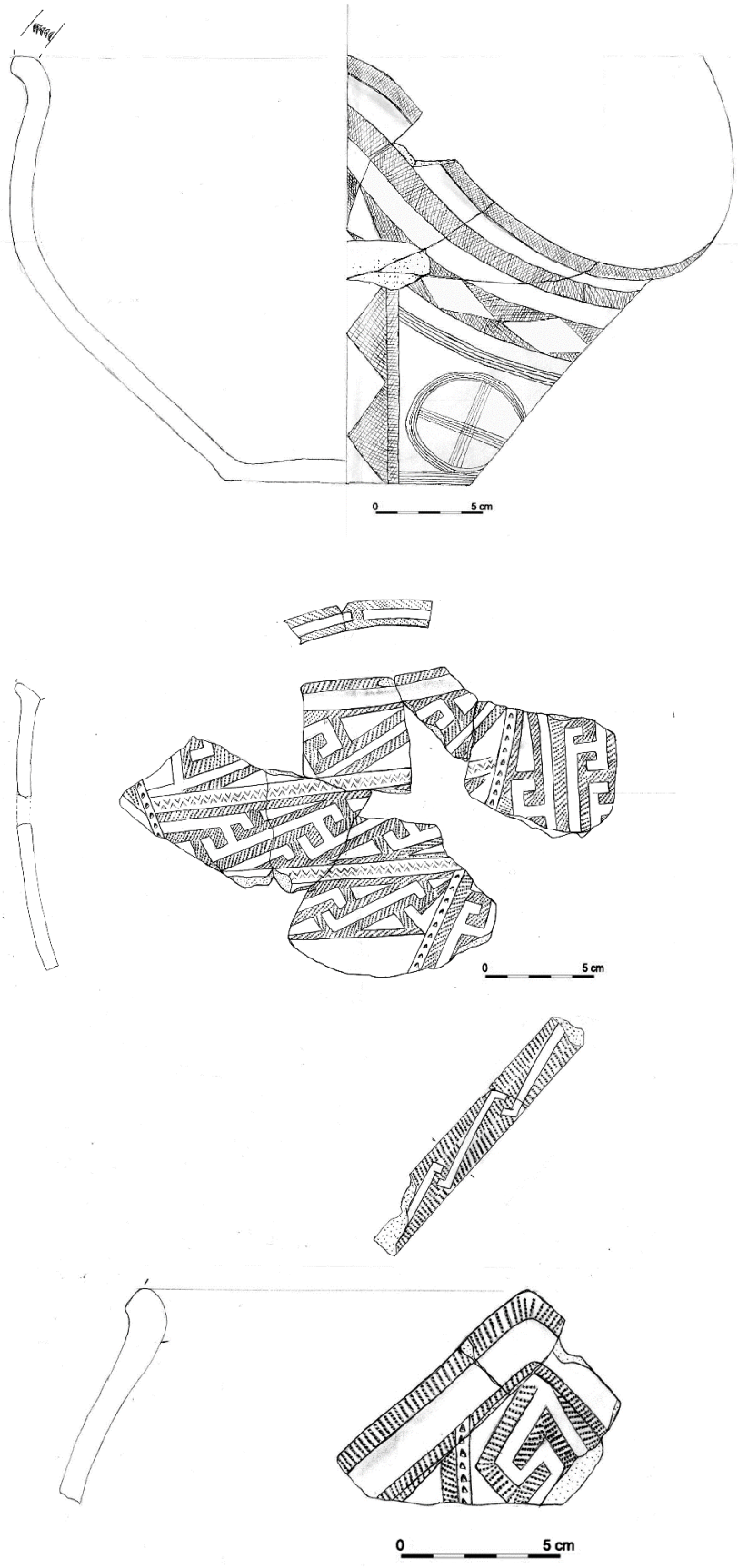

Fig. 4. Intricate decoration with repetitive geometric motifs.
Decor complex format din motive geometrice care se repetă.

A mass grave and other contexts containing human remains discovered in the Hallstatt-period site at Tărtăria – *Podu Tărtăriei vest* (Alba County)

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Abstract: *The First Iron Age (Hallstatt period) in Transylvania, as well as in the territory of nowadays Romania, is less understood from the perspective of the funerary phenomena. The main reason is determined by the rarity, in some cases (areas) even the absence of investigated graves from approx. the 12th c. to the 8th/7th c. BCE. The necropolises of this period are located mainly at the periphery of the geographic space bordered by the Carpathians and Lower Danube. A new funerary find made in 2012 at Tărtăria – Podu Tărtăriei vest brought new evidence in regard to this topic. Within a very specific type of site, a mass grave was uncovered – six skeletons laid in various positions and orientations, as well as a human skull. Other parts of human skeletons were uncovered in the southern delimitation ditch of the site, as well as in one of the pits (6 archaeological contexts in total, with fragments from 9 individuals). The unusual character of the site is also suggested by the discovery of two ditches marking the southern and eastern limits of the site, and two bronze hoards (comprising 400 bronze and iron objects, dated to the Ha C1 period – the Bâlvăneşti-Vinţ series, 8th c. BCE), as well as by a large quantity of Basarabi-type pottery (numerous complete vessels) and metal objects. The grave goods related to the six skeletons and the skull consisted of three small cups, characteristic to the Basarabi ceramic style, as well as certain small (adornment) objects made of bronze and iron. As mentioned, five other archaeological contexts were also investigated, containing parts of human skeletons associated with Basarabi-type pottery. In the current stage of the research on the site it is rather difficult to conclude on the purpose and meaning of such a burial and deposits. Nevertheless, this discovery provides new elements for analysing and understanding the funerary phenomena along the First Iron Age in Transylvania, especially for the so-called Middle Hallstatt period (the Basarabi culture).*

Rezumat: *Prima epocă a fierului (perioada hallstattiană) în Transilvania, ca de altfel în mare parte a teritoriului actual al României este mai puțin înțeleasă din perspectiva fenomenului funerar. Acest fapt se datorează rarității unor asemenea descoperiri, iar în unele cazuri (zone) chiar absenței unor morminte cercetate, databile din perioada sec. XII–VIII/VII a. Chr. Necropolele acestei perioade sunt în general situate la periferia spațiului delimitat de Carpați și Dunărea de Jos. O nouă descoperire funerară a survenit în anul 2012, în cadrul sitului Tărtăria – Podu Tărtăriei vest, aceasta aducând noi date asupra fenomenului funerar hallstattian în aria intracarpatică. În cuprinsul acestui sit cu specific aparte, a fost descoperit un mormânt colectiv conținând 6 schelete (dispuse în varii poziții și având orientări diferite) și un craniu. Alte fragmente de schelet uman au fost descoperite în șanțul sudic de delimitare al sitului, precum și în inventarul unor gropi. Caracteristicile aparte ale sitului în discuție sunt determinate de descoperirea a două șanțuri de delimitare situate în zona sudică și estică a sitului, precum și de două depozite de bronzuri (conținând peste 400 de obiecte din fier și bronz, databile la nivel de Ha C1 – seria Bâlvăneşti-Vinţ sec. VIII a. Chr.); de asemenea, au fost descoperite o mare cantitate de ceramică de tip Basarabi (numeroase vase întregi și întregibile) și obiecte din metal. În cadrul mormântului colectiv au fost descoperite 3 mici vase specifice ceramicii de tip Basarabi, cât și mici obiecte de podoabă din bronz și fier. După cum s-a menționat, au mai fost cercetate alte 6 contexte arheologice conținând resturi osteologice umane (de la 9 indivizi) asociate cu ceramică de tip Basarabi. În stadiul actual al cercetării cu privire la situl în discuție este dificil de concluzionat cu privire la scopul și semnificația acestei înmormântări și al celorlalte depuneri. În mod cert, această descoperire aduce noi elemente pentru analiza și aprofundarea fenomenului funerar de-alungul perioadei*

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hallstattiene în spațiul intracarpatic, în special în ceea ce privește perioada mijlocie a primei epoci a fierului (cultura Basarabi).

Keywords: *Tărtăria, middle period of the first Iron Age (Middle Hallstatt), Basarabi culture, mass grave, archaeological context with human bone remains associated with Basarabi type pottery.*

Cuvinte cheie: *Tărtăria, perioada mijlocie a primei epoci a fierului (Hallstatt mijlociu), cultura Basarabi, mormânt colectiv, contexte arheologice cu resturi osteologice umane asociate cu ceramică de tip Basarabi.*

◈ Introduction

The Middle Hallstatt period in Romania is equalled with Ha B3 and Ha C in Central Europe according to Müller-Karpe system that tries to offer absolute chronology for the Iron Age. This period is also equalled with the manifestation of the Basarabi culture, the most representative cultural phenomena in the carphato-danubian area. The Middle Hallstatt period starts around 850/800 and lasts until 650 B.C., although in some regions the evolution of some Early Hallstatt period cultures continues (A. László 2010, p. 290-294). This period was defined especially on the characteristic of the ceramics.

Funeral practices of the Basarabi period are known only by a handful of isolated inhumation or incineration graves and tumulus. Necropolis have been researched only in the south-west area of the Basarabi culture, along the Danube River, all of them being tumulus discoveries. These funerary finds are very rare in comparisation with the large number of settlements.

◈ Site location

In 2012, during the construction of highway A1: Orăștie – Sibiu, segment Orăștie – Sebeș, large-scale preventive archaeological research was undertaken, which led to the identification of a new Hallstatt-period site (pertaining to the Basarabi culture), located near Tărtăria, Alba County (C. Borș *et alii* 2013, p. 9–102).

The Hallstatt-period site is located on the second terrace of the River Mureș (actually, geologically, the earliest terrace), on the river's left bank, South of road DN7 (at the present moment North of the above-mentioned highway) and West of road DC705E (fig. 1/1-2). The archaeological diagnosis works and preventive archaeological research were undertaken by a team of archaeologists from the Romanian National History Museum, in the framework of the National Research Program "Autostrada" ("The Highway").

The site's area was first delimited between km 14+100 and km 14+500 of the future A1 highway's trajectory, with the archaeological vestiges concentrated between km 14+240/250 and km 14+540. We have identified and investigated 269 archaeological contexts and complexes, on a surface of approximately 2 ha. Among these we mention 7 contexts containing human bone remains (entirely or partially preserved), belonging to at least 16 individuals (fig. 1/3). In two cases we can consider that the deceased were found in funerary contexts (CPL 114/114B and CPL 186), with the skeletons in an anatomical position, the rest of the cases presenting uncertain situations.

In the following pages we will present the conditions for the discovery of the mass grave and the other 6 archaeological contexts in which human bone remains were discovered, as well as the ceramic material they were associated with.

◈ The mass grave

Complex CPL 114 ("the mass grave") / Individual 1 to Individual 7 (fig. 4/1–2). Initially the complex appeared as a large (D_{max} = 3 m), relatively circular darker (dark brown) area, with pottery and wattle and daub fragments on the surface, around 8–9 m N of the site's southern delimitation ditch. It was identified in S III, south from km 14+410 (highway's axis), a few metres away from what used to be a ravine in the Basarabi period, according to the general stratigraphy of the S III surface (fig. 2).

At the beginning we thought it could have represented the ruins of a semi-buried dwelling, and therefore opted for sectioning it on an E – W axis. Immediately after sectioning it, in the pit's northern half, at a depth of around -0.15 m from the level the context was identified at, we discovered a small bronze object (pendant). On the same level we also discovered a small, simple bronze link.

At a depth of -0.20 m from the level the context was identified at we discovered several extremely friable bone fragments. After a careful analysis we discovered that these were human bones, belonging to 5 individuals, with the skeletons in an anatomical position, laid in different modes and with different orientations.

In order to obtain a general image of this special archaeological situation, we carefully investigated the pit's entire surface between -0.30 and -0.40 m from the level on which the complex has been outlined. Thus, we identified 6 human skeletons *in situ*, which were registered Individual 1 to Individual 6. The human bone remains were preserved in a very bad state, many of them very friable, and in certain cases only their traces were visible. From the beginning of the research on the human skeletons we noticed that the individuals were laid in a pit and not randomly.

In the complex's southern part, after excavating the first 6 skeletons and cleaning the lower part of CPL 114, we noticed the presence of another oval pit (registered as CPL 114B, L=1.75 m, l=1.05 m), oriented E – W, on whose surface we uncovered a seventh skull, accompanied by a fragmentary small cup set very close to its SW limit. The skull was not in an anatomical connection to the other bone remains, and the mandible was missing. In this second pit's fill, no other human bone remains were discovered but only fragments of animal bones. The last skull was registered as Individual 7 and represents the first deposit in the funerary context CPL 114. Another small and circular pit was identified on the same level as CPL 114B, this time in the central-northern part of CPL 114 and was registrated as CPL 114C. This was (most probably) a pole pit (D = 0.4 m), that went approx. 0.40 m deeper than the lower level of the pit where Individual 1 – Individual 6 were laid and had the same dark fill with intrusions as the rest of the complex, but with no archaeological material.

The fill of pit CPL 114, as well as the one of CPL 114B and CPL 114C, is made up of black sediment with traces of wattle and daub, but with a larger amount of archaeological material. Therefore, the first pit was dug up in the SE part of the mass grave and in here was deposed the skull of Individual 7, together with two small mugs and a circular stone. This pit was soon after leveled with the same soil with inclusions similar to the one covering Individual 1 to Individual 6. In the upper level, over the one where the skeletons were laid, in the fill, several pottery fragments were discovered and, scattered among them, a series of fragments from the upper half of a mug (partially preserved body, neck, rim and handle) with decorations specific for the Basarabi pottery. Among the Individual 1 – Individual 6 skeletons, the number of pottery fragments was much smaller than on the previous level.

Individual 1 (fig. 3/1–2) – was laid in a dorsal position, slightly bent from the pelvis northwards (towards its left side), so that it's right leg superposed the left one at knee level.

The skull rested on its left side, facing NE. On the maxilla were identified six teeth, and on the mandible another six. The skull and upper thorax of Individual 1 were superposed by Individual 2's right foot, which was bent near Individual 1's right collarbone, so that Individual 2's lower right leg pointed westwards and was located approx. 10 cm from the occipital area of Individual 1's skull. At the same time, Individual 2's lower left foot superposed Individual 1, so Individual 2's left femur was lying over Individual 1's right arm's joint and was bent over the thorax. Both Individual 2's right patella, as well as Individual 1's right shoulder, was slightly moved from the initial position when research on the complex first started. Individual 2's left arm superposed Individual 1's lower part, the pelvis area respectively. Individual 2's right arm was bent similarly to the left one, slightly more to the E (towards Individual 1's lower legs), but was in a very bad state of preservation. The legs were lying on the side, the right one superposing the left. Only after excavating Individual 4 we noticed, in the area around Individual 1's lower legs, the presence of both calcanei and the traces of the metatarsi and phalange, all in a very bad state of preservation. In the area around the lower right leg we discovered a small bronze object (twisted wire, D=1.92 cm). Since no anthropologist was present during the excavation of the mass grave, parts of the skeleton had to be measured (by the archaeologists) *in situ* (tab. 1) as correct as possible (due to the poor state of conservation of the bones) for further use on the post-excavation analysis. When excavating the lower part, to the E, we discovered under the right femur several small bone fragments, initially mistaken for phalanges. Under the left tibia and peroneus we discovered a long bone, better preserved, possibly from an adult, positioned on a SW – NE direction. The phalanges of the left arm were lying under Individual 2's right humerus, and could only be seen after the latter was excavated. In the current state of the post-excavation and anthropological analyses (G. Vasile, M. Ilie 2015), 9 teeth seem to belong to an individual, other than Individual 1 – Individual 6, estimated to be around 6-7 years old. This individual was later marked (during the anthropological analysis) as Individual 17.

In the area between Individual 1 and Individual 2 we discovered, in the pit's fill, traces of charcoal, small calcined bones and several pottery fragments, mostly atypical with the exception of a handle with decoration typical for the Basarabi culture.

Individual 2 (fig. 3/1, 3) – was located in the centre of the complex's NW quadrant, between Individual 1 and Individual 3. It was laid in a crouching position, on its left side, facing W. The body seems to have been deposited after Individual 1 and Individual 3, which it partially superposed. The skeleton has an approximate SE – NW orientation. We noticed that part of the spine and of the mandible were missing, which we explained through the bad state the skeletons were found in. Many of the bones, especially in the area around the lumbar vertebrae, were only preserved as an imprint. The skull was twisted facing down, to the left or W respectively. On the right side of the thorax we identified nine ribs, on the left only eight, the latter being partially superposed by the former. The right arm was bent towards the skull, apparently with the phalanges laid in the occipital area. The left arm was bent at a 90° angle over Individual 1's pelvis. From the latter only the left part seems to have been preserved, and we only had the imprint in the ground left from the right part. The legs were bent and superposed Individual 1's upper part, so that Individual 2's right leg touched Individual 1's scapula, and Individual 2's tibia and fibula superposed Individual 1's skull longitudinally. The left leg was bent in the area of Individual 1's thorax, with the tibia and fibula parallel to Individual 1's right humerus. As far as the funerary inventory directly associated with Individual 2 is concerned, we mention a simple bronze link, located in the right part of the skull. After excavating Individual 2's skull, under it to the left we discovered another small

fragmentary bronze object, probably also a simple wire link. In the area of the right humerus we found a small iron link, and in that of the thorax half of another small bronze link.

Individual 3 (fig. 3/1, 4) – the skeleton was lying on its left side, facing W, in the NW quadrant of CPL 114, with its legs touching the pit's limit. The skeleton was oriented SE – NW. The mandible and maxilla were superposed by the right humerus, and only some teeth were discovered. The spine seemed to be slightly moved between the cervical vertebrae and the rest of the spine. At a first glance, Individual 2 seems to have been laid with the thorax facing downwards, so that the left humerus was lying on an E-W direction down to the thorax, and the left arm's ulna and radius (including the phalanges) superposed the right ulna and radius. They seemed "torn" from the elbow and bent sharply inwards. The left arm's phalanges were superposed by the right humerus and went under the thorax. Six–seven ribs from the left side and 8 from the right side were discovered. The vertebrae's imprint in the ground was all that was preserved from the spine. The pelvis was lying on the felt side and superposed the left femur. The right femur superposed the left leg's knee, with both legs' lower part parallel on a SE – NW direction. After excavation, under the lower left leg we discovered a long bone, probably animal, with no anatomical connection with the rest. Between Individual 2's and Individual 3's skulls, approx. 3 cm from the front of skull Individual 3, we discovered another fragmentary bronze small ring, representing the funerary inventory of the deceased.

Individual **4** (fig. 5/A) – was laid almost in the centre of complex CPL 114, with a SE – NW orientation, the skull facing E. The skull was laid on the side and was in anatomical connection with the spine. The thorax was laid in a dorsal position; the arms were bent towards the skull. We discovered the phalanges on the right, towards the mandible's base, under the humerus. Apparently the right arm was sharply bent backwards, with the palm set downwards, under the ribs. The pelvis was laid on the right side and was sharply bent eastwards from the left hip. This part of the skeleton was badly damaged. The legs were also sharply bent, so that they were parallel to the spine. The left femur was the uppermost bone in the legs' area, with the rest sharply bent under the former. The legs were bent under the pelvis, and the lower part of the right leg was located towards the sacral area.

Individual 5 (fig. 5/B, 1–2) – was laid on its right side, in a semi-crouching position, in the NE quadrant. The skull was to the W and was facing SE, and the legs were towards the E. The lower part of the legs touched the eastern extremity of the pit. The left ulna and radius were superposed by Individual 6's left arm. The phalanges of Individual 5's right arm were reaching towards the skull, under Individual 6's left leg. Near the right leg's patella, Individual 5 superposed Individual 6's left side of the pelvis. The skull touched the phalanges of Individual 6's left arm and was laid on the right side. The body was laid on the right side slightly bent from the pelvis southwards. Only the bone imprints were preserved from the spine and left ribs. The right leg was more sharply bent than the left one. The right calcaneus touched the base of the pelvis. The left leg was bent at 45° from the knee, so that the tip of the lower bones were pointing E. As funerary inventory, discovered at the base of the left leg was a spherical bronze bead (slightly flattened), and in the area around the chest another very small bronze conical object, preserved only partially. During the excavation, on the right side of the thorax small, unidentifiable iron fragments appeared, set 5 cm from one another.

Individual 6 (fig. 5/B, 2–3) – the upper part of the body was laid in a dorsal position, down to the pelvis, with the legs sharply bent to the right, in an abnormal position (they seemed broken). The skeleton was laid in the SE quadrant of complex CPL 114, with the skull located approximately in the middle of the pit. The skeleton's orientation was SW – NE. The lower part of the legs touched the pit's eastern limit. The spine seemed broken in the cervical

area. The skull was facing NE and had the mouth open (most probably due to the movement of the mandible by the earth's pressure in time). The left arm was sharply bent towards the left scapula, so that all the bones of the arm were approximately parallel to one another, with the phalanges touching what seemed to be the left collarbone. The right humerus was parallel to the body, the arm bent over the pelvis at an angle larger than 100°, with the phalanges set over the coccyx and the pelvis' left side, covered, in their turn, by Individual 5's right leg's knee. The left leg was accidentally affected during the research in the northern half of the archaeological complex, so that the left femur, tibia and fibula were cut in half. Only the imprint in the ground was preserved from the left leg. The latter, bent at 45°, superposed the right leg, which was laid in a similar position, with the knees pointing S. From the right leg were missing the lower bones and only the calcaneus was preserved. We suppose the phalanges were pointing E. The body was not accompanied by an inventory. This seems to have been the largest of all the skeletons.

Individual 7 (fig. 6/1–2) – was identified in the SE part of the complex, after excavating skeletons Individuals 1 – 6 when, in order to reach the pit's final depth, the excavation reached a second, oval pit, CPL 114B, that went deeper than the level where the others were buried. Here we discovered a human skull, missing the mandible. The skull was facing E. Very close to the SSW we discovered a mug broken on the spot (fig. 6/3), with a missing handle, as well as a circular stone to the SW. Therefore, Individual 7 seems to have been the first to be *deposited*, before the other 6 skeletons. There is no evidence that CPL 114B was dug up long before CPL 114. Most probably, CPL 114 B represents a deeper part of CPL 114, made to deposit the skull with its funerary inventory (as a special funerary practice of the community), and on top of it the other 6 skeletons were laid carefully.

Individual	Skeleton length cm	Humerus cm	Radius/Ulna cm	Femur cm	Tibia/ Fibula cm	Pelvis cm	Palm cm	Foot cm
1	144	28	21	37	34-35	18	22	21-22
2	116	27	25	36	33-34	22	?	?
3	115	34	?	45-46	45	23	?	15
4	64	19	15-16	26	18	12	?	?
5	117	30	29	38	36	26	26	20
6	115	32	28	42	36	?	12	?
7	-	-	-		-	-	-	-

Tab. 1. Preliminary measurements taken *in situ* on the preserved bone fragments**.**
Măsurătorile preliminare *in situ* ale resturilor osteologice conservate.

The fill of pit CPL 114 B was made up, as well, of black earth with traces of wattle and daub. Under skull of Individual 7 other pottery fragments were discovered, as well as animal bones and molars of *Sus scrofa/Sus domesticus.* Among the pottery fragments was identified a second mug, associated to Individual 7 (fig. 6/4). The rest of the material found are inclusions and can not be directly associated with any of the individuals deposited here.

As far as the pottery in the fill of pits CPL 114 and CPL 114B is concerned, 162 pottery fragments were identified, 130 of which are atypical, the other 32 having different decoration elements specific for the Basarabi culture or elements that identify the type of pot they were part of. Among these we have to mention handle fragments (fig. 7/1–3), generally from raised

handles, decorated (with rows of continuous "S"s and/or a row of oblique imprints. The handles in this archaeological complex's inventory have either an oval or a crescent cross section. We must also mention the basic handles (fig. 7/4, 6), simple, oval or with alveolae, the latter being part of a jar-type pot decoration. Generally, the decoration of the pottery fragments in this context is represented by bands with alveolae or indentations (fig. 7/12; fig. 8/1), horizontal grooves (fig. 7/8, 10), as well as elements typical for the Basarabi culture. We come across such geometrical motives made of hatched triangles (fig. 7/7) or decorations made by alternating rows of "S"s (fig. 7/11) with rows of oblique indentations (fig. 7/9).

The types of pots that were found in this complex have the shapes usually found in the Basarabi culture. Most seem to be tronconical pots with a highly protruding rim, sometimes decorated (fig. 8/2–3), both on the outside and on the inside. Some rim fragments, as well as bases, suggest the presence of the jar-type pots (fig. 8/1, 4–5) that, unlike the ones mentioned above, are generally made of a coarser paste. On the latter, the only decoration is made up of bands with indentations or alveolae, indentation on the rim and, in this case – protrusions. Another four rim fragments certainly come from pots with an inwards protruding rim (fig. 8/6–9). These could come from bowls, generally undecorated, or from plates decorated with horizontal or oblique grooves in the pot's upper part. Among the pottery fragments described above, fragments from the upper part of a mug typical of the Basarabi culture were discovered (fig. 9/1).

In the case of Individual 7, we can consider that the two small pots (cups) were directly associated with the burial of the skull. The cup closest to the skull has an oval mouth; the only decoration elements are two shallow grooves, located on the pots' maximum circumference (fig. 9/3). The second cup associated with Individual was found near the W limit of pit CPL 114B (fig. 9/2). The cup's shape is similar to the one previously described, but the decoration is this time typical for the Basarabi decoration. Apart from these fragments typical for the Basarabi culture, two other fired clay objects were discovered. One is a clay ball (D_m=2.8 cm) (fig. 9/4), and the second is an unidentifiable, rectangular fragmentary object, slightly arched and with a tear-shaped cross section (fig. 7/5), both of them could have been part of the funerary inventory.

◈ Human remains found in non-funerary contexts

Individual 8. At the base of trial trench CPL 004F[1], dug on the trajectory of the site's southern delimitation ditch, registered as CPL 004/118, several bone fragments were

[1] One of the most important observations that can be made in this stage of the excavation is the one about the existence of a ravine in the S part of the site, a natural structure with anthropic interventions, which was (preliminary) interpreted as a delimitation ditch of the prehistoric area of habitation. This is the south limit of the site, with a V-E direction on a distance of over 250 m. Initially this structure was identified in the W part of the original area of research, and was marked as CPL 004. Afterwards, in the SE corner of this initial area of research another liniar structure was noticed. This was marked as CPL 118. In the context of the research it was clear that CPL 004 is continued by CPL 118, but taking in consideration the fact that in its eastern part the structure was affected by modern industrial constructions, we chose to keep both markings. Given the dimensions and the characteristics of the structure, the work calendar and the logistics at our disposal, transverse trial trenches were made: in the eastern part (CPL 118) where the presence of the archaeological material was increased, 9 trial trenches were made and in the western part (CPL 004) where the archaeological material was significant 23 such trial trenches were made. These transverse trial trenches were made with mechanical and manual resources. To these we added two

discovered on a surface of 3.5 × 2 m, as well as pottery shards, small bronze objects, wattle and daub fragments and stones (fig. 10/1–2). Among them we identified a human skull, laid on its left side facing SE. Approximately 0.30 m E of the skull were discovered several fragmentary long bones, seemingly human (at least a femur fragment, tibia/fibula). These were not in an anatomical position. Other bone fragments were also scattered in the above-mentioned surface, but their bad state of preservation prevented a clear identification (animal or human). The presence of these human remains at to base of the trench is difficult to be understood, being difficult to conclude if this is a result of an intendend deposition or the result of an unintended human action. The bronze objects were found 0.40 m S and 1.20 m SE from skull Individual 8, and they are a simple link and a multi-spiral hair pin with an "8"-shaped ending.

From the area where human bones registered as Individual 8 were found, approximately 370 pottery fragments were collected, 20 of which are typical (fig. 11/1–15). Three of them represent broken (initially raised) handles, one with a triangular cross section with a central groove and the others with a hexagonal cross section (fig. 11/1–3). Other pottery fragments have a decoration specific to the Basarabi culture (fig. 11/5–9). None of the pottery fragments mentioned above can be directly associated with the human remains identified as Individual 8, and in the absence of complete/completable pots we should rather consider them as being part of the archaeological complex's fill, as well as the other objects.

Individual 9. In the W end of excavation unit S IV we excavated the transverse trial trench CPL 004H using mechanical means under archaeological supervision. In its eastern half, at approx. -1.45/-1.55 m below the present day surface, bone fragments from at least one human skull were discovered. They were registered as Individual 9. Later we started a larger excavation unit at the trial trench's lower level and identified remains from two other human skulls and several – possibly human – bones at the base of the trench on the same level with Individual 9. Later on, these remains were marked as Individual 11. All the remains were found on the bottom of the trial trench.

Individual 10. Human bones were discovered near the lowest level in transverse trial trench CPL 004K from excavation unit S V, open at a right angle on the site's southern delimitation ditch (CPL 004/118), in its centre, at a depth of approx. -1.60 m from the current surface. Here were discovered several ribs and long bones fragments (possibly from the arms) in a very bad state of preservation (fig. 12/1). The bones' dimensions could not be established. Apart from the bones we discovered a handle fragment with a triangular cross section. At approx. 1.50 m W of the human remains, near the trench's western profile, we identified a fragmentary mug (under restoration[2]), laid on its side, its mouth to the S (fig. 12/2), and under it a bone (animal?), but these were not directly associated with Individual 10.

main sections, S003 north and S008 south, both of them were crossing – almost perpendicular – CPL 004. Beyond this, on the plateau towards the village of Tărtăria, inside the limit of expropriation of the highway no indication of the presence of archaeological potential was noticed. The southern delimitation ditch of the hallstattian site represents a structure with particular characteristics, both in terms of natural (the presence of numerous springs) and archaeological (votive deposits dated in the period of the Basarabi culture / HaC – bronze hoards, methal artefacts, pottery and fragments of human remains) aspects. There are also two later discoveries in the superior part of this structure: a coin hoard from the Latène period and a bronz fibula from the roman period.

[2] Restoration of the pottery discovered during the preventive archaeological research at Tărtăria – *Podu Tărtăriei vest*, undertaken in the laboratories of the National History Museum of Romania – Department of Restoration by Ms Gabriela Dragomir and Ms Ileana Zaharia, is almost complete.

Individual 11 – Individual 13. Three human skulls were discovered in the lower part of transverse trial trench CPL 004H, dug at a right angle on the site's southern delimitation ditch CPL 004/118 (fig. 13/1–2). The human bones were found almost in the centre of the transverse trial trench, near its NE profile, all at the same level, with no traces of a pit. Their presence at the base of the trial trench can not be interpreted as a funerary deposition.

Individual 11 consist in an isolated skull, and it was located in the E part of the complexe. It was facing down, pointing slightly eastwards. Near it were discovered several bone fragments, possibly in connection to it, as well as pottery fragments.

Individual 12 was located between Individual 11 and Individual 13, at approx. 1 m W from the first and 0.30 m SSE from the latter. Only several fragments from the upper skull were preserved, and badly, and they could not provide information on the skull's orientation. Three stones were found around it.

Individual 13 contained the trace of an upper skull and several badly preserved bones from it, representing the westernmost remains from the group of skulls discovered at the base of transverse trial trench CPL004H. As with the previous case, the skull's orientation could not be established.

None of the three skulls had directly-associated archaeological inventory, and in the absence of other bone remains/skeleton parts their presence in the lower part of the southern delimitation ditch is not entirely clear.

171 pottery fragments and several wattle and daub fragments were collected in the area around Individual 11 – Individual 13. 41 of them are typical fragments (fig. 14/1-15), many of which have a specific Basarabi culture decoration. The only pottery fragment with a zoomorphic representation discovered in the site comes from this complex. This is a fragment of protruding rim, with a horse drawn on the inside, using incised lines for the contour and a hatch for the surface (fig. 14/15).

Even if no complete/completable pots were discovered in the area of Individual 11 – Individual 13, there we identified the upper part of a bitronconic pot with a highly protruding rim and a decoration specific to the Basarabi culture (fig. 13/14). Other shapes are protruding rim pots, pots with the rim turned inwards (bowls, plates), including a fragment perforated in its upper part. We also identified eight fragments from the bases of medium or small pots.

Individual 14. The second complex with human remains in an anatomical position was identified in excavation unit S IV, at the base of CPL 004/118's southern delimitation ditch, in the N part of transverse trial trench CPL 004R. This pit was marked as CPL 196. At a depth of -1.60 m we identified a black, elongated oval complex, on whose surface one could see several bone fragments (fig. 15/2). Thus, in the complex's NE half we identified from the beginning the remains of a human skull facing downwards, partially affected by the excavation using mechanical means, as well as another long bone along and S of the skull, (fig. 15/4). Several pottery fragments were discovered on this level, but to the pit's southern limit. This skeleton was registered as Individual 14.

After excavating the bones and collecting the pottery on this first level, we noticed that the pit extended to the NE, beyond the western profile of CPL 004R. We decided to excavate using mechanical means the western part of the trench, and were therefore able to see the pit's final contour. On the same level with the above-mentioned bones we found the bones of the left arm and both legs, without the femurs though, all in anatomical position (fig. 15/5). The rest of the bones were missing, and not even their imprint in the ground could be found. Thus, Individual 14 was laid in a crouching position on its left side and had the skull moved post-mortem, oriented W - E. The arm was bent from the elbow, with phalanges pointing NNW.

The upper part of the humerus was accidentally affected during research on the complex. The left arm was located W from the skull. Several measurements were taken *in situ*: the ulna and radius measured 24 cm from the elbow to the carpians, and the tibia and fibula approx. 33 cm from the knee to the calcaneus. The legs were on the left side, to the N, and almost parallel. The tip of the legs was pointing NNE. The bones of Individual 14 were in a better state of preservation than those of Individual 1 – Individual 7. Even the calcaneus, metatarsians and phalanges from both legs were preserved, as well as the arms' phalanges and carpians. Between the bases of the two legs we discovered two other bone fragments, phalanges, most probably moved there from the right leg. Approx. 0.20 m E of Individual 14, adjoining the complex's limit, we found an oval stone.

As far as we could establish, Individual 14 was laid in a rectangular pit (CPL 186) with rounded corners, measuring 1.40 × 0.90 m (fig. 15/1,3). It was oriented W - E and reached the depth of a maximum of 0.15 m from the complex's upper level. The fill was made up of black-grey earth, with yellow intrusions.

Individual 14 had no "funerary" inventory apart from 37 pottery fragments scattered in the fill of the pit, of which only eight are typical (fig. 16/1–8). The most important pottery fragment is the upper part of a bitronconic pot with a typical Basarabi decoration (fig. 16/1 – a, b).

Apart from the two funerary contexts with human remains in an anatomical position (Individual 1 – Individual 7 and Individual 14) and the five cases (Individual 8, Individual 10 and Individual 11 – Individual 13) discovered in the lower part of the transverse trial trenches excavated on the trajectory of CPL 004/118's southern delimitation ditch, human bones were also discovered in the fill of other archaeological complexes, initially considered to be domestic pits. In none of these cases was a skeleton in anatomical position discovered, only scattered bones, mixed with other archaeological material (pottery and wattle and daub fragments).

Individual 15. In the site's eastern part, when starting the dig in excavation unit S XII, square 6, we identified the contour of an oval complex, 2.26 m long, with a S - N orientation and its E half affected by the mechanical excavation, so its maximum width could not be established (fig. 17/1-4). It was named CPL 242; the pit was dug in a sandy yellow-grey soil, with dark soil intrusions (animal trenches?). In the complex's S corner one could see, even as the excavation was starting, the remains of a skull, a mandible fragment and several postcranian fragments located approx. 0.50 m to the NW and slightly less deep. These were named Individual 15. The human bone fragments were in a medium state of preservation. In the pit's compact, black fill, along with wattle and daub and small charcoal fragments, we discovered several pottery fragments, burnt clay and animal bone fragments.

As far as the pottery is concerned, we discovered 194 fragments, 54 of which are typical: handles with a triangular cross section (fig. 18/1–4), fragments decorated with stamped (fig. 18/5–9, 12, 15) or incised (fig. 18/11, 14) patterns, grooves (fig. 18/8, 10–13), applied bands with indentations or alveolae (fig. 18/16–20), simple or decorated protruding/turned inwards rims (fig 19/1–2), with patterns specific to the Basarabi culture, as well as indented patterns, with different accessories (handles), rims turned inwards from undecorated bowls or from bowls decorated with grooves, protrusions, incised or stamped patterns (plates) (fig. 19/3–7) and pot bases of medium dimensions. The pottery fragments along with the other materials, including the human remains, can all be considered intrusions in the fill of the pit CPL 242.

Individual 16. These human bone fragments were identified during post-excavation processing, among bone fragments coming from CPL 199's pits fill, and were not initially classified as being human. The complex was first identified as a black spot with several pottery

fragments visible on the surface, as well as traces of wattle and daub and charcoal. The pit was oval (1.90 × 1.40 m), with tronconic walls and a flat base (fig. 20/1–2).

Due to the large quantity of fragmentary and diverse archaeological material, the complex can be considered a domestic pit. Several fragmentary pots were identified, including a large bulging pot, with a tall neck and four sharp protrusions facing upwards, set at the base of the neck, a mug with decoration specific to the Basarabi culture (fig. 21/1) and a plate with a highly protruding rim, with similar decoration (fig. 22/1–5). Other typical or atypical pottery fragments were discovered, as well as consistent fragments of fired clay/adobe, different size fragments of charcoal, well preserved animal bones, fired on non-fired, as well as three fragments from two processed antler objects. Among the animal bones, which in the case of the complex under discussion were found in a significant quantity compared to other complexes discovered on the site, were discovered during post-excavation processing[3] several human long bones. These were registered as Individual 16.

The pottery material is made up of 156 atypical and 72 typical fragments (fig. 20/3–13). The shapes of the pots whose fragments were "thrown" in this pit are typical for the Basarabi culture. They are bitronconic pots, some with a rich decoration, others with a much simpler decoration, jar pots with incised or alveolated rims and bands, pots with inward-turned rims such as bowls (undecorated) or plates decorated especially with grooves on the rim, as well as with incised patterns, a pot made of coarse paste, with circular and oval protrusions on its body (fig. 21/2), a mug with decoration specific to the Basarabi culture (fig. 21/1). Other types of pots are represented mainly by fragments of their walls, stamped (including ones inlaid with a white paste) or incised, and often grooved. We also discovered bases of small pots, most probably cups, with no decoration.

◈ Discussions and conclusions

The phenomenon of laying human bones inside settlements is documented for the Hallstatt period especially in the Babadag culture. For the Basarabi culture such discoveries are much less common and documented.

The best analogy for the mass grave at Tărtăria – *Podu Tărtăriei vest* is a similar discovery at Gomolava, in Vojvodina region (Serbia). Here were identified and researched two pits containing many more skeletons (mass graves), attributed to the Bosut III horizon, which is largely contemporary to the Basarabi-type discoveries on the territory of present-day Romania (N. Tasić 1972, p. 27–32).

More burials inside settlements are known from the Babadag culture. Chronologically, the closest discoveries are those from the third phase of the Babadag culture, namely: several pits in the settlement at Babadag (S.C. Ailincăi *et alii* 2007, p. 80–84), Enisala – *Palanca*, Izvoarele – *Biserica satului* (M. Irimia 2003, p. 254–255, fig. 1), Novoseľskoe – *Teraphont* (I.V. Bruiako, E.J. Noviţkii 1997, p. 117–121), Orlovka – *Cartal* (V.P. Vančugov *et alii* 1999, p. 137), Rasova – *Malu Roșu* (M. Irimia 1974, p. 124–125) and Revărsarea – *Cotul Tichilești*.

As far as the Hallstatt period in Transylvania is concerned, pits containing human bones were discovered at Baciu (Z. Kalmar 1987, p. 166–168), as well as in the fortified settlement at Teleac (V. Vasiliev *et alii* 1991, p. 42–43). At Alba Iulia – *Lumea Nouă* (Al. Vulpe 1965, p. 132, no. 54; H. Ciugudean 1976, p. 13-14, no. 3; Al. Vulpe 1986, p. 51, no. 2; V. Moga,

[3] The archaeozoological study of the discoveries at Tărtăria – *Podu Tărtăriei vest* was undertaken by Adrian Bălășescu and Valentin Radu from the National History Museum of Romania and is ongoing.

H. Ciugudean 1995, p. 29, no. 6/1; Ciugudean 1997, p. 138, no. 3; Ursuțiu 2002;, p. 82, no. 1) and at Iernut – *Casa Vlassa* (Ciugudean 1976, p. 14; Al. Vulpe 1986, p. 58, no. 83a; V. Lazăr 1995, p. 154, no. XLVII; H. Ciugudean 1997, p. 142, no. 25; A. Ursuțiu 2002, p. 90, no. 35) were discovered pits with ceramic pots, but the context of these discoveries is unclear, so some specialists consider them possible cremation graves, even if in none of the situation could one find traces of burn or cremated bones, while others say these are just pottery deposits. We must mention that pits with pots deposited inside, the so-called pottery deposits, were found in several contexts in the site at Tărtăria – *Podu Tărtăriei vest*, but there is no indication to suggest that they could be considered funerary deposits.

Even if the typological and chorological analysis of the ceramic material discovered at Tărtăria – *Podu Tărtăriei vest* is still in an early stage, we must mention that the shape of the pots in the discoveries at Alba Iulia and Iernut is also common in the Basarabi pottery, and some of them have analogies even in the mass grave at Tărtăria (mugs, cups or bitronconic pots), even if the decoration is different.

Also, in the River Mureș Valley we must mention the discoveries at Berghin – *Lascău* (V. Moga, H. Ciugudean 1995, p. 55, no. 5; H. Ciugudean 1997, p. 138, no. 6; A. Ursuțiu 2002, p. 83, no. 8) and Chendu Mare – *Podei* (I.H. Crișan 1965, p. 134–135; V. Vasiliev, A. Zrinyi 1983, p. 172–173; V. Vasiliev, A. Zrinyi 1987, p. 91–116; H. Ciugudean 1997, p. 139, no. 11; A. Ursuțiu 2002, p. 86–97, no. 17), where Basarabi cremation necropolises are thought to have been identified. At Berghin surface research was undertaken in 1977, following which were collected pottery and burnt bones from a settlement dated to the Middle Hallstatt, namely the Basarabi culture; in the absence of proper archaeological research and published material, attributing a cremation necropolis remains uncertain. At Chendu Mare a cremation grave was discovered by chance, containing six pots (chronologically attributed to the period HaC – HaD). In 1979–1980 archaeological excavations were undertaken nearby, but no other graves were found, only the traces of a Hallstatt settlement contemporary to the one discovered in 1961. The shape of these pots is common to the ones we find in the Basarabi culture, but the decoration is different. This discovery is considered more likely to pertain to a late phase of the Basarabi culture, contemporary to an early phase of the Ferigile group at the middle of the 7th c. BCE (Al. Vulpe 1986, p. 55, no. 36a).

These discoveries at Tărtăria – *Podu Tărtăriei vest* bring into attention certain different manners of treating the deads in comparison with the data known up to know from the Basarabi-age necropolises. First of all, this mass grave (CPL 114) is until now the only case known to the Basarabi environment on nowadays Romania's territory. The rest of the discoveries of human remains from Tărtăria (Individual 08 to Individual 16) indicate a particular manner of treating of deceased individual within a habitation area, being possible to represent non-funerary contexts.

Up to the present moment the mass grave and other contexts containing human bones represent a special discovery for the Basarabi culture, and force us to reconsider the study of the funerary phenomenon in the first Iron Age in the area inside the Carpathian arch and in the Lower Danube basin area.

◈ Acknowledgements

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◈ References

S.C. Ailincăi *et alii* 2007 — S.C. Ailincăi, G. Jugănaru, A.C. Țârlea, M. Vernescu, Early Iron Age complexes with human remains from the Babadag settlement, *Peuce (SN)*, III–IV, p. 77–108.

C. Borș *et alii* 2013 — C. Borș, L. Irimuș, V. Rumega, S. Dobrotă, C. Rișcuța, Un nou sit de tip Basarabi. Raport preliminar asupra cercetărilor arheologice preventive la Tărtăria – Podu Tărtăriei vest (Campania 2012), *CA*, XX, p. 9–102.

I.V. Bruiako, E.J. Noviţkii 1997 — Grădiștea Novosel'skoe II (Satu Nou II) – Un nou complex tracic la Dunărea de jos, *Cercetări Arheologice în Aria Nord-Tracă*, 2, p. 114–168.

H. Ciugudean 1976 — Cultura Basarabi pe teritoriul județului Alba, *Apulum*, XIV, p. 9–22.

H. Ciugudean 1997 — *Cercetări privind epoca bronzului și prima vârstă a fierului în Transilvania*, Bibliotheca Musei Apulensis, VII, Alba Iulia, 230 p.

I.H. Crișan 1965 — Once more about the Scythian problem in Transylvania, *Dacia (NS)*, IX, p. 133–145.

M. Irimia 1974 — Cercetările arheologice de la Rasova – Malu Roșu. Raport preliminar (Cu privire specială asupra Hallstattului în Dobrogea), *Pontica*, 7, p. 75–132.

M. Irimia 2003 — Den Grabritus und die Grabrituale der Babadag-Kultur – Gemeinschaften betreffend, *Thracia*, 15, p. 251–268.

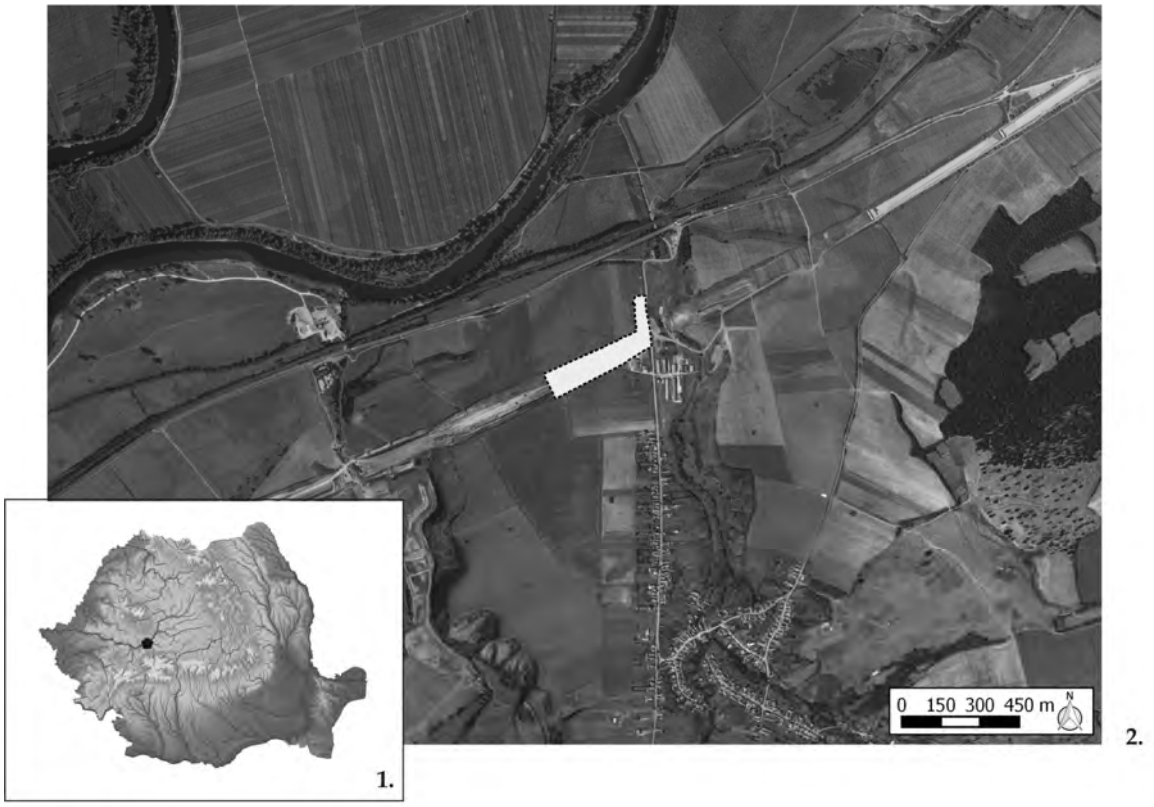
Z. Kalmar 1987 — Contribuții la cunoașterea ritului funerar hallstattian, *SCIVA*, 28 (2), p. 166–174.

A. László 2010 — Prima epocă a fierului. Istoric și caracterizare, în M. Petrescu-Dâmbovița, Al. Vulpe (eds.), *Istoria Românilor, vol. I, Moștenirea timpurilor îndepărtate*, ediția a II-a, Editura Enciclopedică, București, p. 289-295.

V. Lazăr 1995 — *Repertoriul arheologic al județului Mureș*, Casa de editură "Mureș", Târgu Mureș, 357 p.

V. Moga, H. Ciugudean 1995 — *Repertoriul arheologic al județului Alba*, Bibliotheca Musei Apulensis II, Alba Iulia, 237 p.

N. Tasić 1971	An Early Iron Age collective tomb at Gomolava, *Archaeologia Iugoslavica*, XIII, p. 27–37.
A. Ursuțiu 2002	*Etapa mijlocie a primei vârste a fierului în Transilvania (Cercetările de la Bernadea, com. Bahnea, jud. Mureș)*, Editura Nereamia Napocae, Cluj-Napoca, 181 p.
V.P. Vančugov *et alii* 1999	V.P. Vančugov, I.T. Niculiță, V. Sârbu, V. Cojocaru, Rezultatele perieghezelor arheologice în stepele Buceagului din anul 1997, *Cercetări Arheologice în Aria Nord-Tracă*, 3, p. 117–133.
G. Vasile, M. Ilie 2015	Assessment of an Iron Age skeletal assemblage from Romania, Tărtăria *Podu Tărtăriei vest* (Alba County, Romania), *SP*, 12, p. 195-205.
V. Vasiliev, A. Zrinyi 1983	Raport asupra cercetărilor de la Chendu, jud. Mureș, *MCA,* XV, p. 172-173.
V. Vasiliev, A. Zrinyi 1987	Așezarea și mormintele din prima epocă a fierului de la Chendu (jud. Mureș), *Apulum*, XXIV, p. 91–118.
V. Vasiliev *et alii* 1991	V. Vasiliev, I.Al. Aldea, H. Ciugudean, *Civilizația dacică timpurie în aria intracarpatică a României. Contribuții arheologice: Așezarea fortificată de la Teleac,* Editura Dacia, Cluj-Napoca, 242 p.
Al. Vulpe 1965	Zur mittleren Hallstattzeit in Rumänien (Die Basarabi Kultur), *Dacia (NS)*, IX, p. 105–132.
Al. Vulpe 1986	Zur Entstehung der geto-dakischen Zivilisation. Die Basarabi-Kultur, *Dacia (NS)*, XXX, p. 49–90.



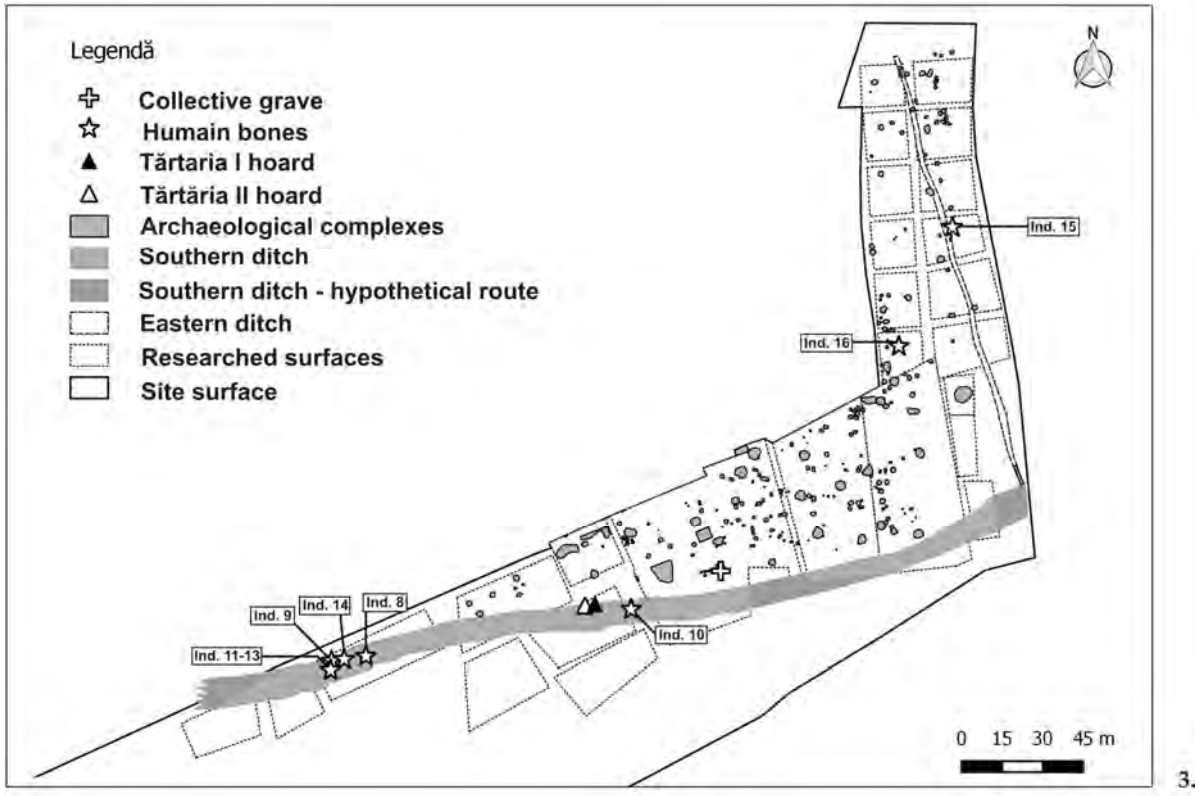


Fig. 1. 1. Location of the site in Romania. 2. Location of the site on the orthophotoplan. 3. Location of the archaeological complexes containing human bones.
1. Localizarea sitului în România. 2. Localizarea sitului pe ortofotoplan. 3. Localizarea complexelor arheologice cu oseminte umane.

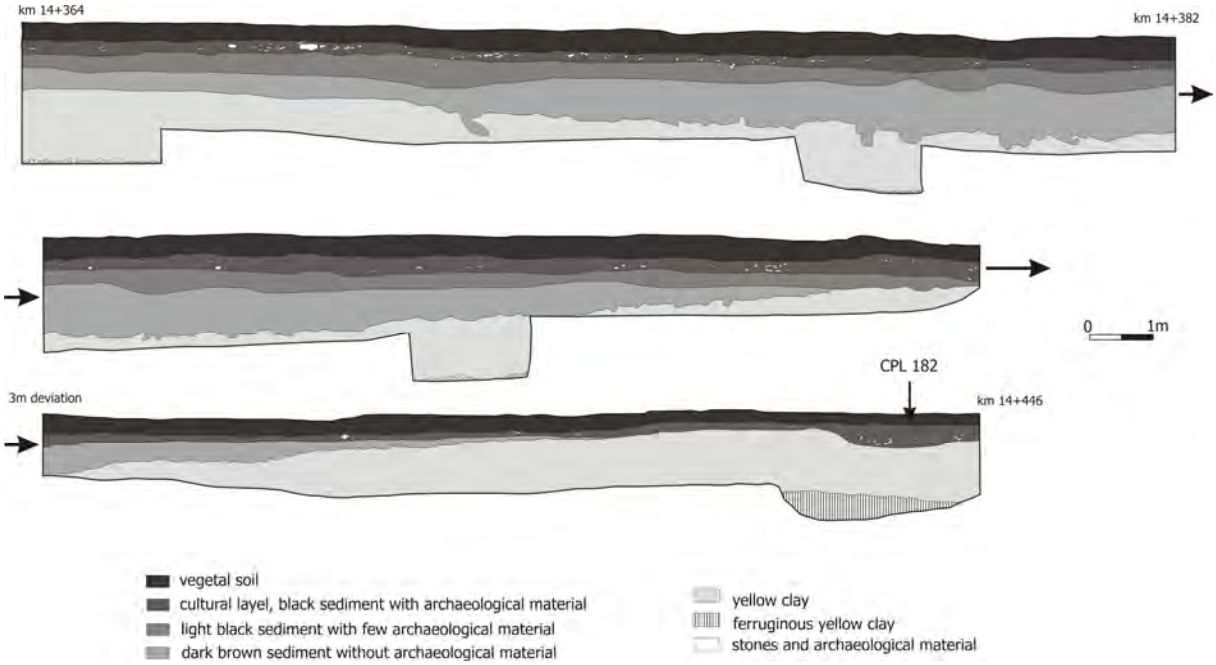


Fig. 2. Section S III – north profile.
Secțiunea S III – profil magistral de nord.

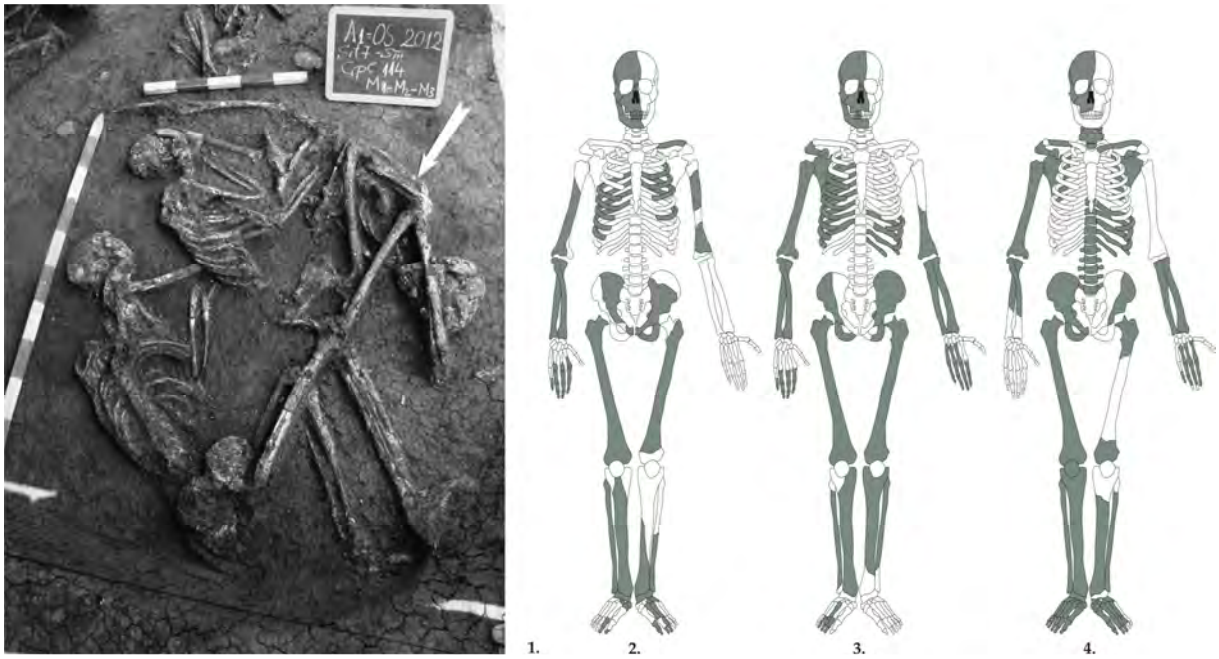


Fig. 3. Detail of Individuals 1 (upper right), 2 (centre), and 3 (lower right). Parts of the skeleton *in situ* in an anatomical position: 2. Individual 1; 3. Individual 2; 4. Individual 3.
1. Imagine detaliu Individ 1 (dreapta sus), Individ 2 (centru), Individ 3 (stânga jos). Părți schelet observate *in situ* în conexiune anatomică: 2. Individ 1; 3. Individ 2; 4. Individ 3.

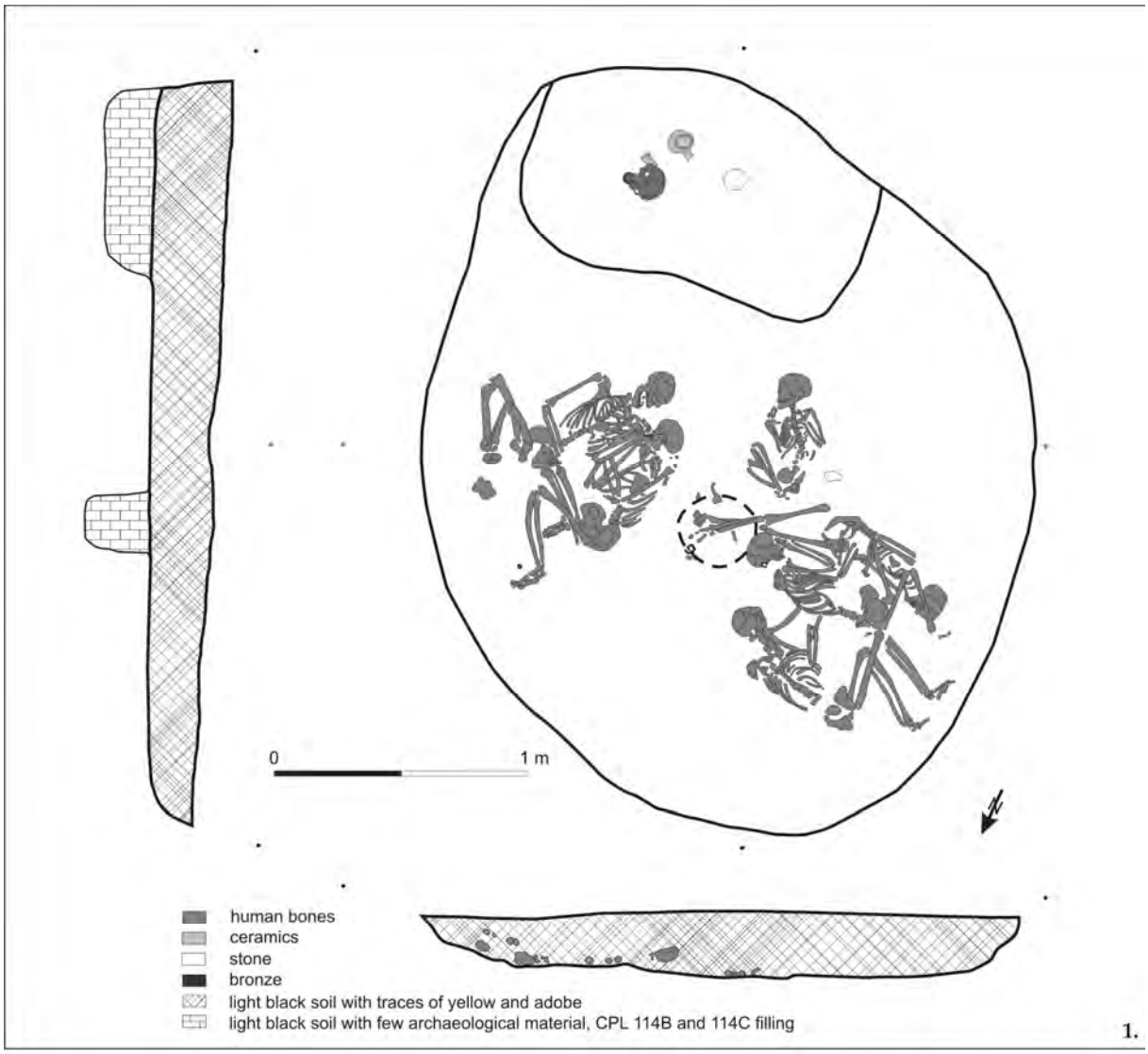
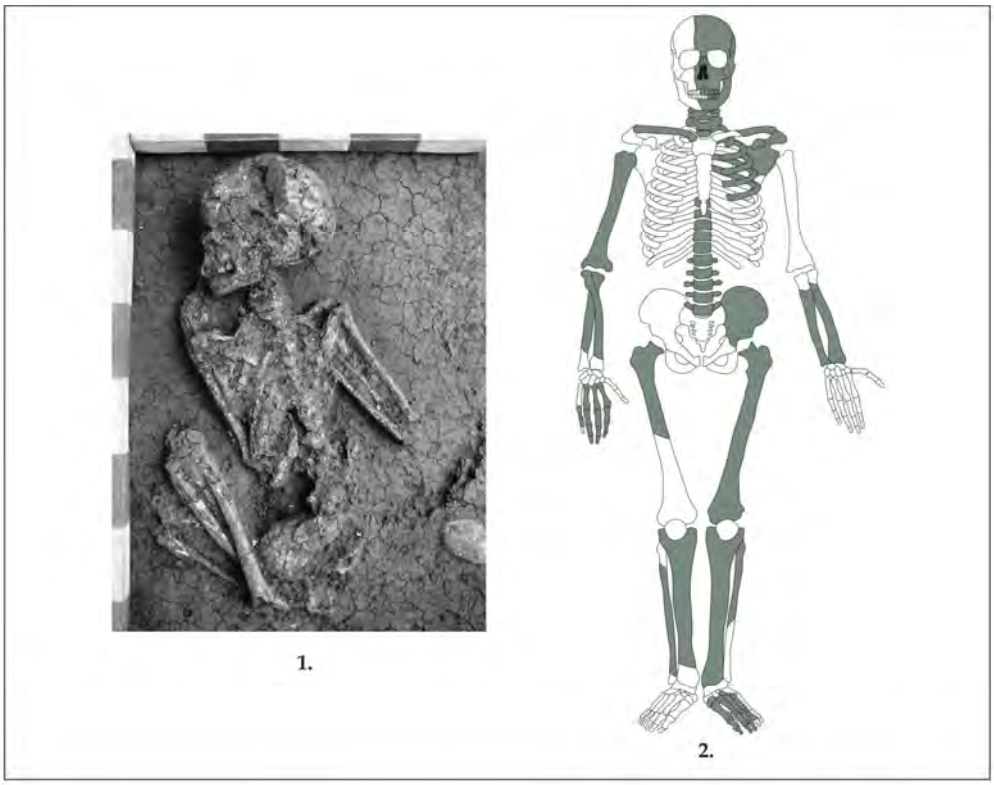


Fig. 4. CPL 114 and CPL 114B (mass grave): 1. Plan and profile; 2. Image taken during the research of the complex.
CPL 114 și CPL 114B: 1. Plan și profil; 2. Imagine din timpul cercetării complexului.



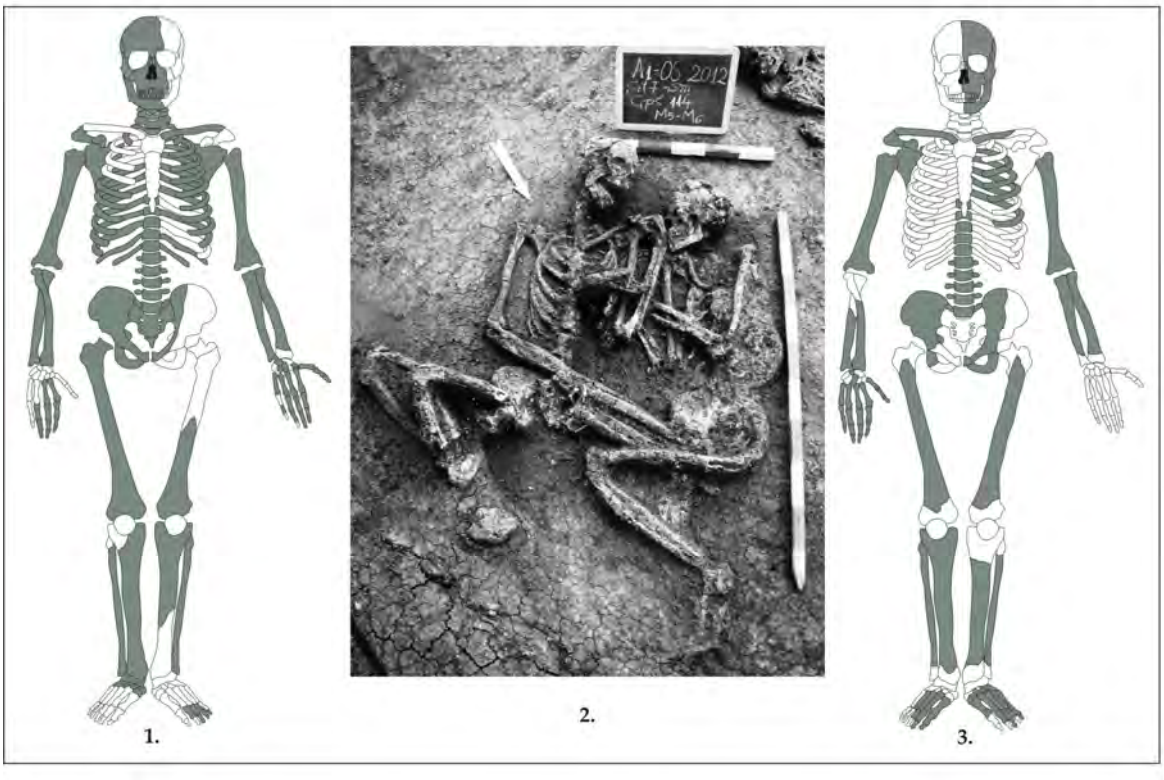
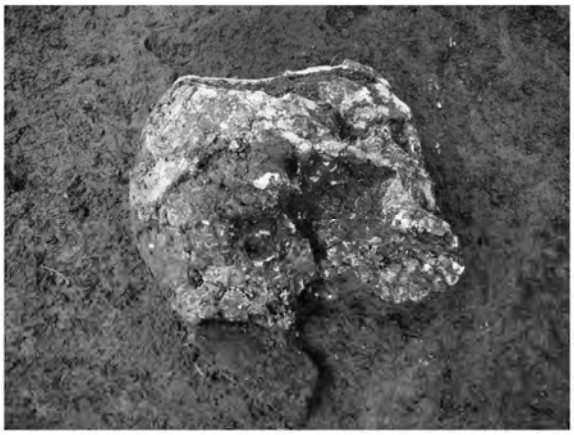


Fig. 5. A). 1. Detail of Individual 4. 2. Parts of the skeleton seen *in situ* in an anatomical position. B) 2. Detail of Individual 5 (left) and Individual 6 (right). Parts of the skeleton *in situ* in an anatomical position: 1. Individual 5, 3. Individual 6.
A) 1. Imagine detaliu Individ 4; 2. Părți de schelet observate *in situ* în conexiune anatomică.
B) 2. Imagine detaliu Individ 5 (stânga) și Individ 6 (dreapta). Părți de schelet observate *in situ* în conexiune anatomică: 1. Individ 5, 3. Individ 6.

1.



2.

3.

4.

Fig. 6. CPL 114B (lower level of the mass grave): 1. General view of Individual 7 and pottery; 2. Detail of skull Individual 7; 3. Detail of ceramic pot 1; 4. Detail of ceramic pot 2.
CPL 114B (nivelul inferior al mormântului): 1. Imagine ansamblu Individ 7 și vase ceramice; 2. Detaliu craniu Individ 7; 3. Detaliu vas ceramic nr. 1; 4. Detaliu vas ceramic nr. 2.

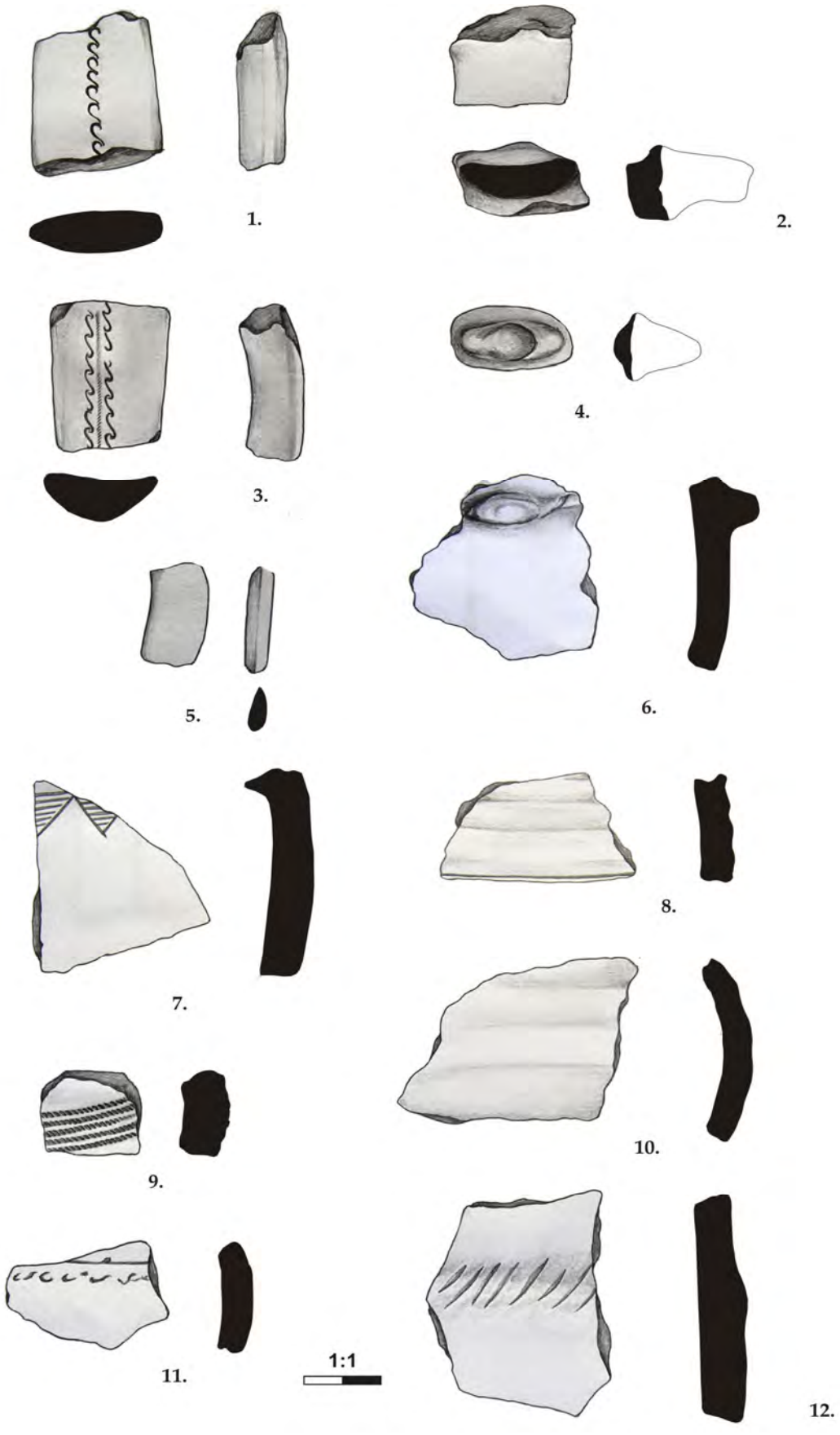


Fig. 7. CPL 114 and CPL 114B: 1–12. Specific ceramic material. Scale in cm.
CPL 114 and CPL 114B: 1–12. Material ceramic tipic. Scara în cm.

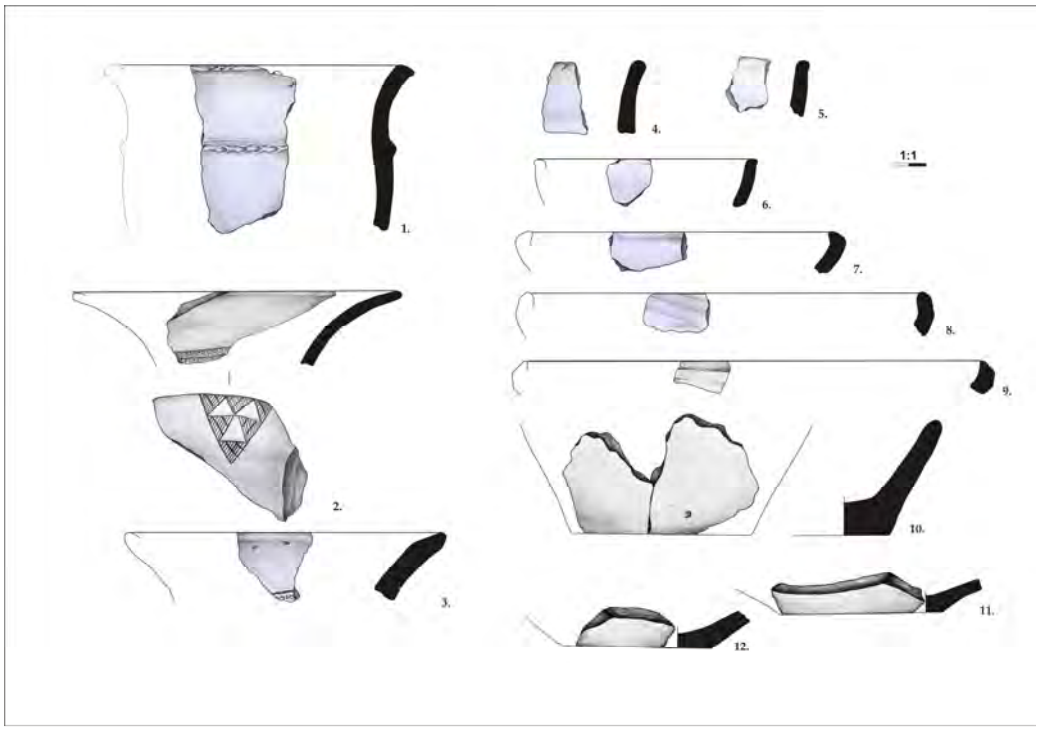


Fig. 8. CPL 114 and CPL 114B: 1–12. Specific ceramic material.
CPL 114 and CPL 114B: 1–12. Material ceramic tipic.

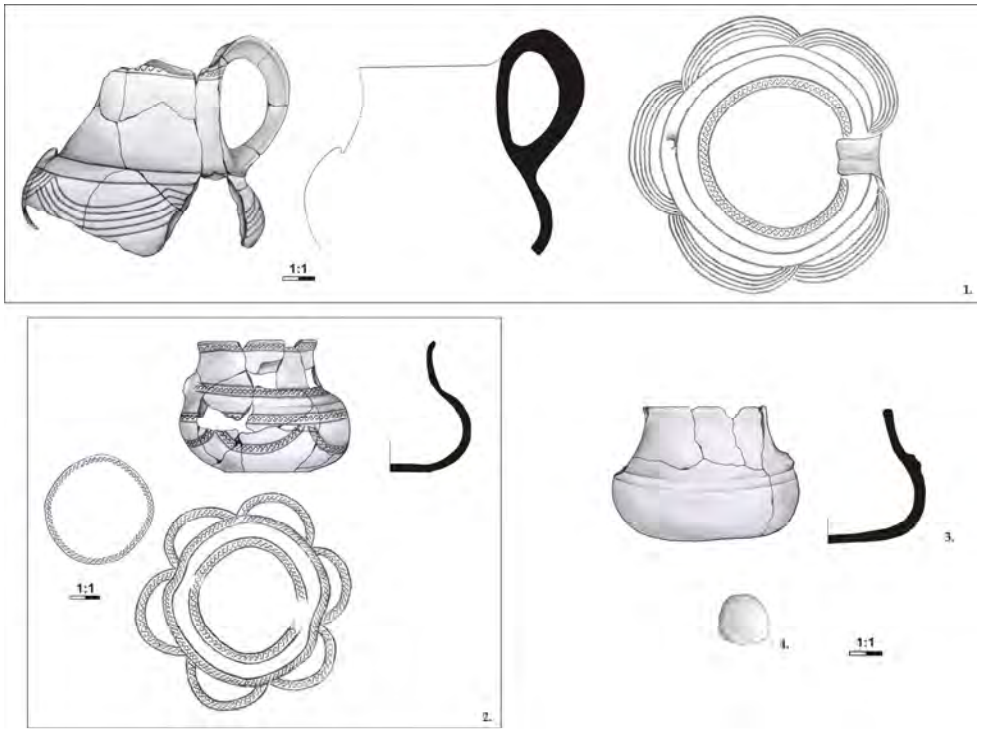


Fig. 9. CPL 114: 1. Fragmentary mug (with the decoration represented unfolded). CPL 114B: 2. Fragmentary cup (with the decoration represented unfolded, on the outside and the inside – the pot-s rim); 3. Fragmentary cup; 4. Clay ball.
CPL 114: 1. Cană fragmentară (cu reprezentarea decorului desfășurat). CPL 114B: 2. Ceașcă fragmentară (cu reprezentarea decorului desfășurat, respectiv exterior și interior – marginea vasului); 3. Ceașcă fragmentară; 4. Bilă de lut.

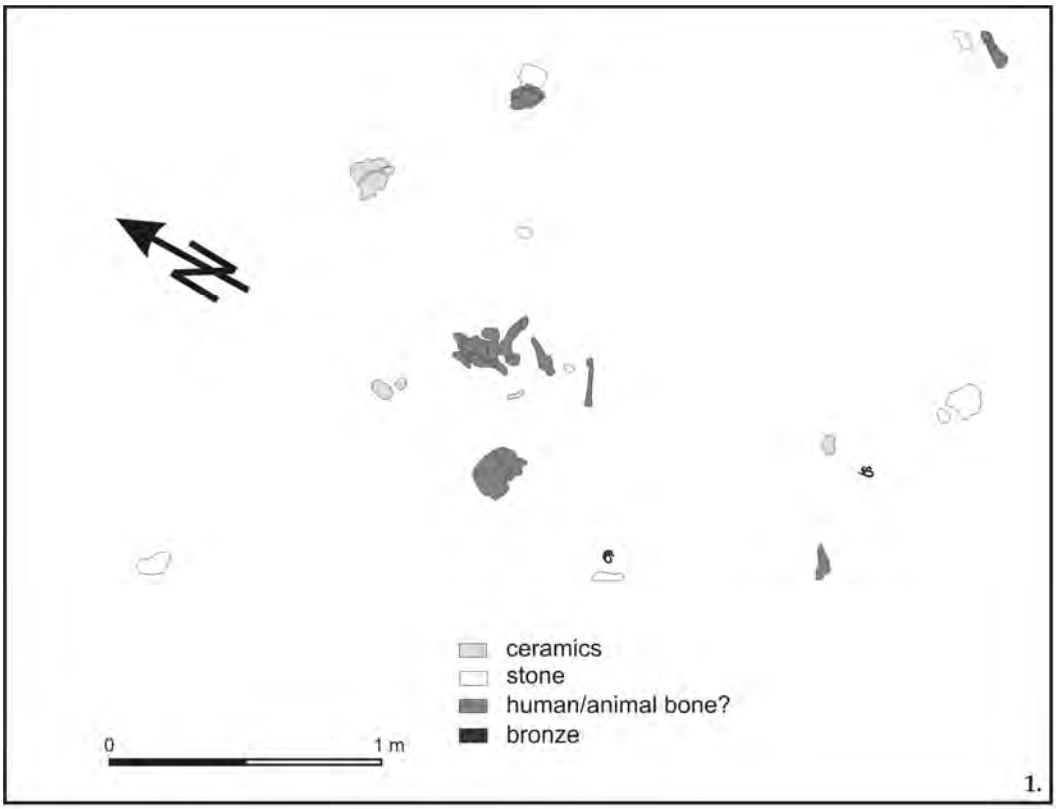


Fig. 10. CPL 004F, detail of Individual 8: 1. Plan; 2. Image from the research of the complex.
CPL 004F, detaliu Individ 8: 1. Plan; 2. Imagine din timpul cercetării complexului.

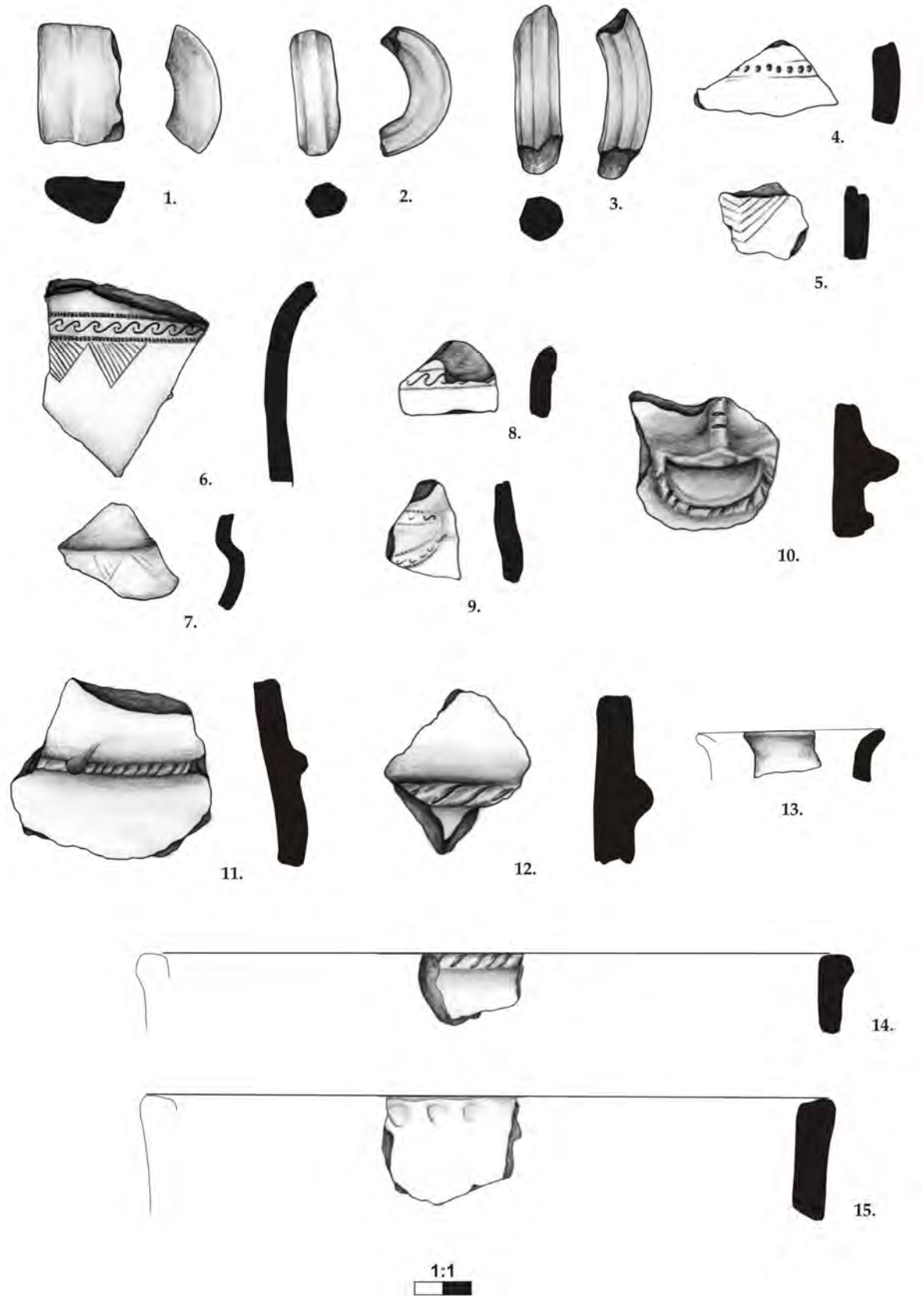


Fig. 11. CPL 004F (area Individual 8): 1–15. Specific ceramic material.
CPL 004F (zona Individ 8): 1–15. Material ceramic tipic.

1.

2.

Fig. 12. CPL 004K/118, detail of Individual 10: 1. Human bones; 2. Pot broken on the spot.
CPL 004K/118, detaliu Individ 10: 1. Fragmente osteologice umane; 2. Vas spart pe loc.

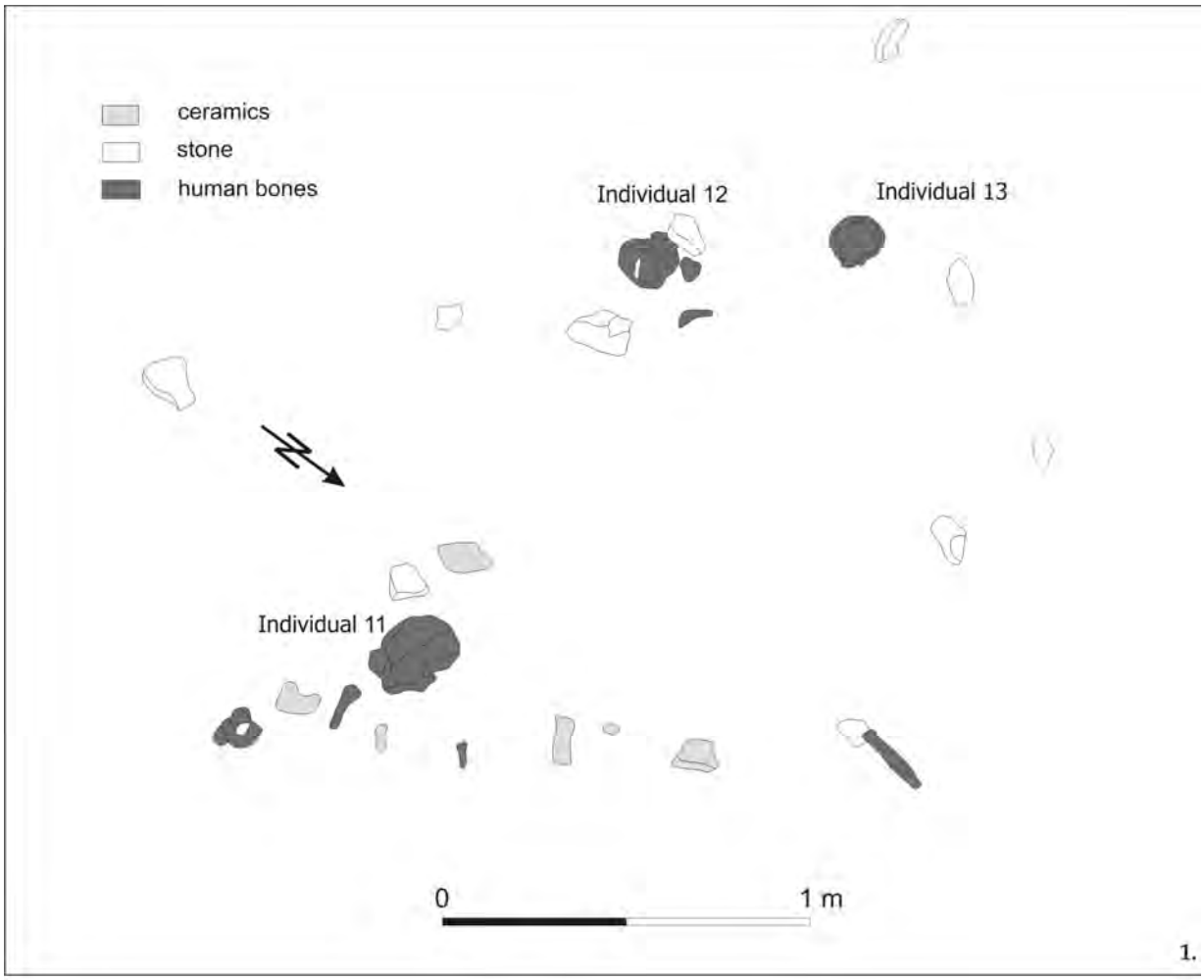


Fig. 13. CPL 004H, Individuals 11 – 13: 1. Plan; 2. Image from the research of the complex.
CPL 004H, Indivizii 11 –13: 1. Plan; 2 Imagine din timpul cercetării complexului.

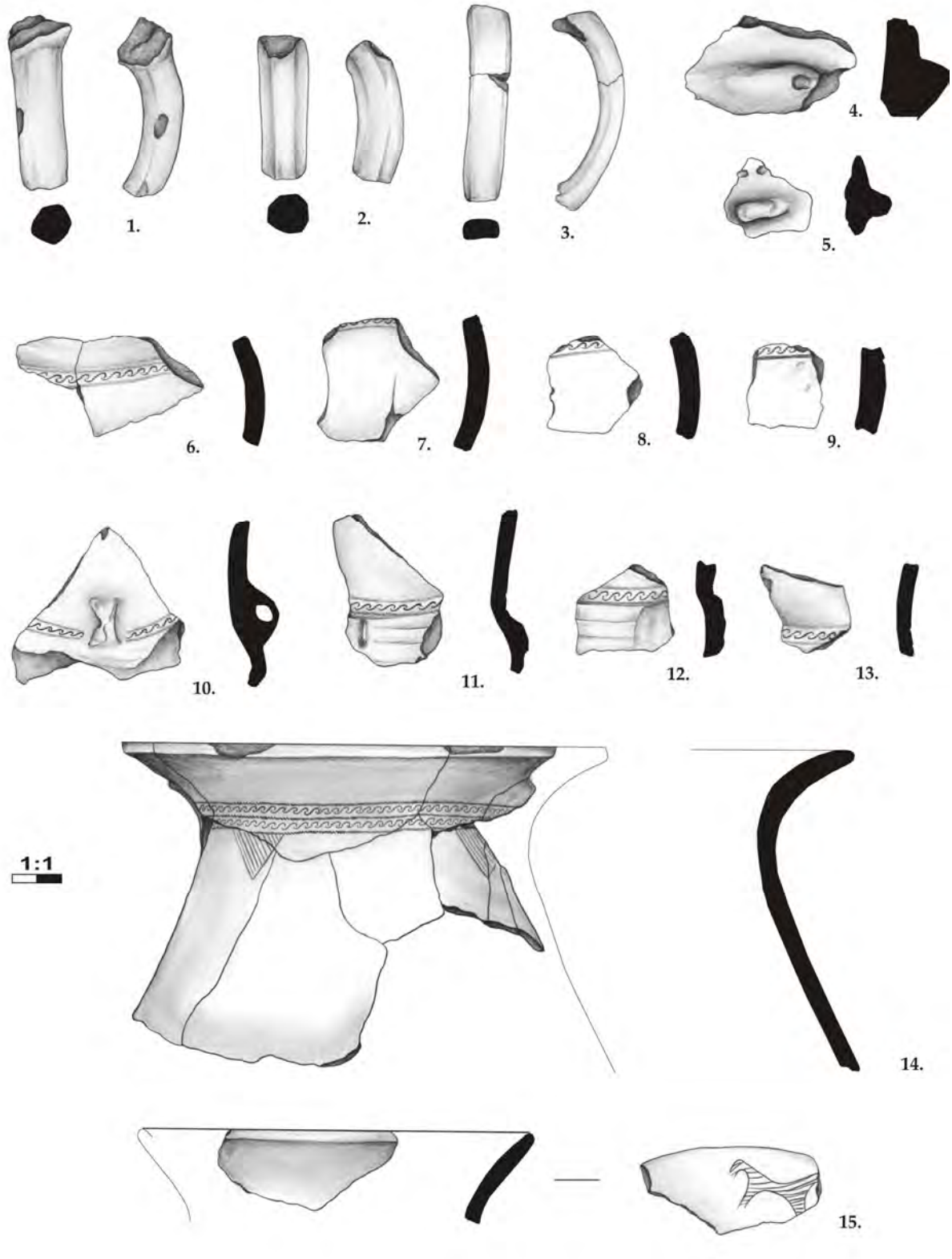


Fig. 14. CPL 004H (area Individuals 11 –13): 1–15. Specific ceramic material.
CPL 004H (zona Indivizilor 11 –13): 1–15. Material ceramic tipic.

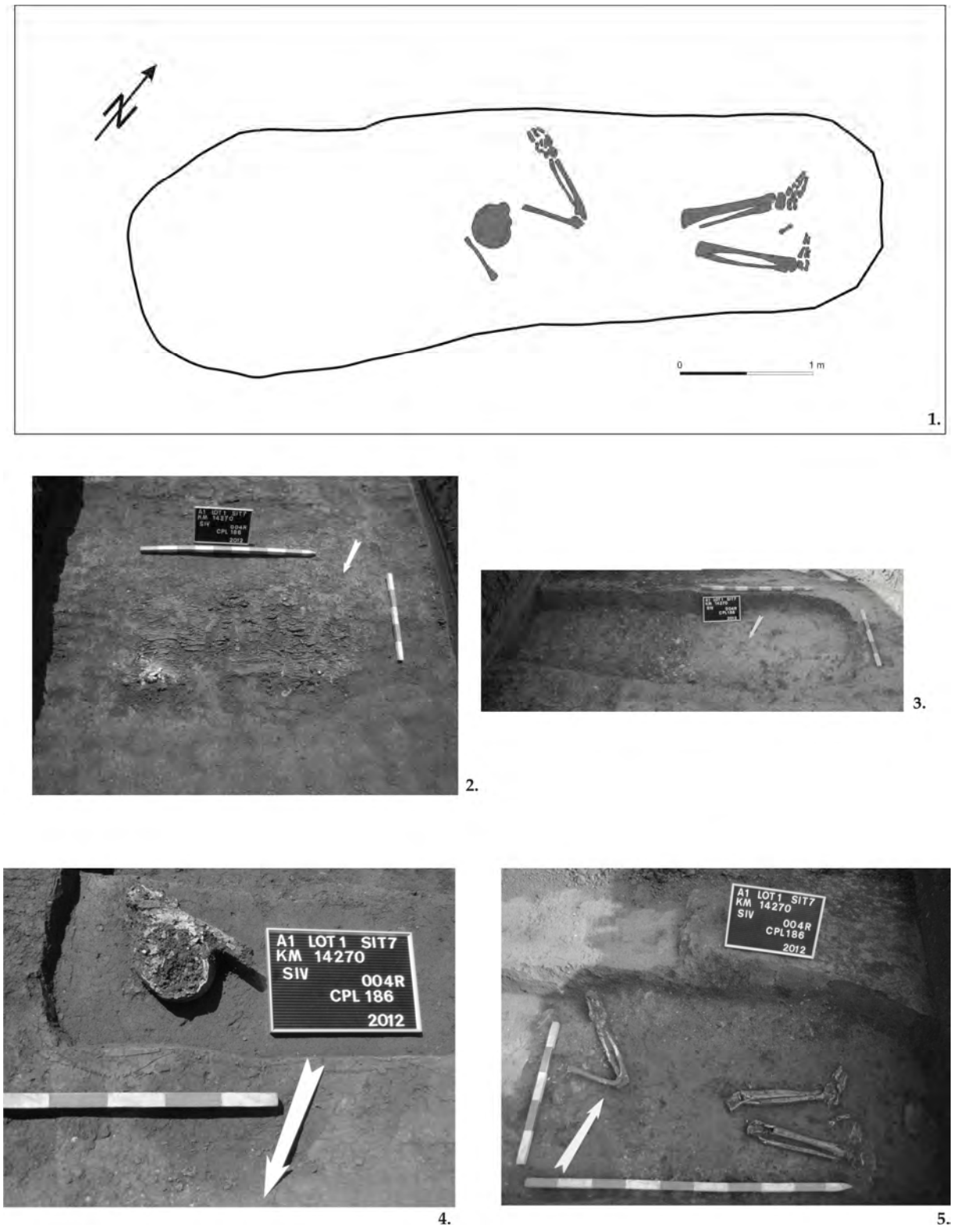


Fig. 15. CPL 186 / 004H, Individual 14: 1. Plan; 2–5. Images from the research of the complex.
CPL 186 / 004H, Individ 14: 1. Plan; 2–5. Imagini din timpul cercetării complexului.

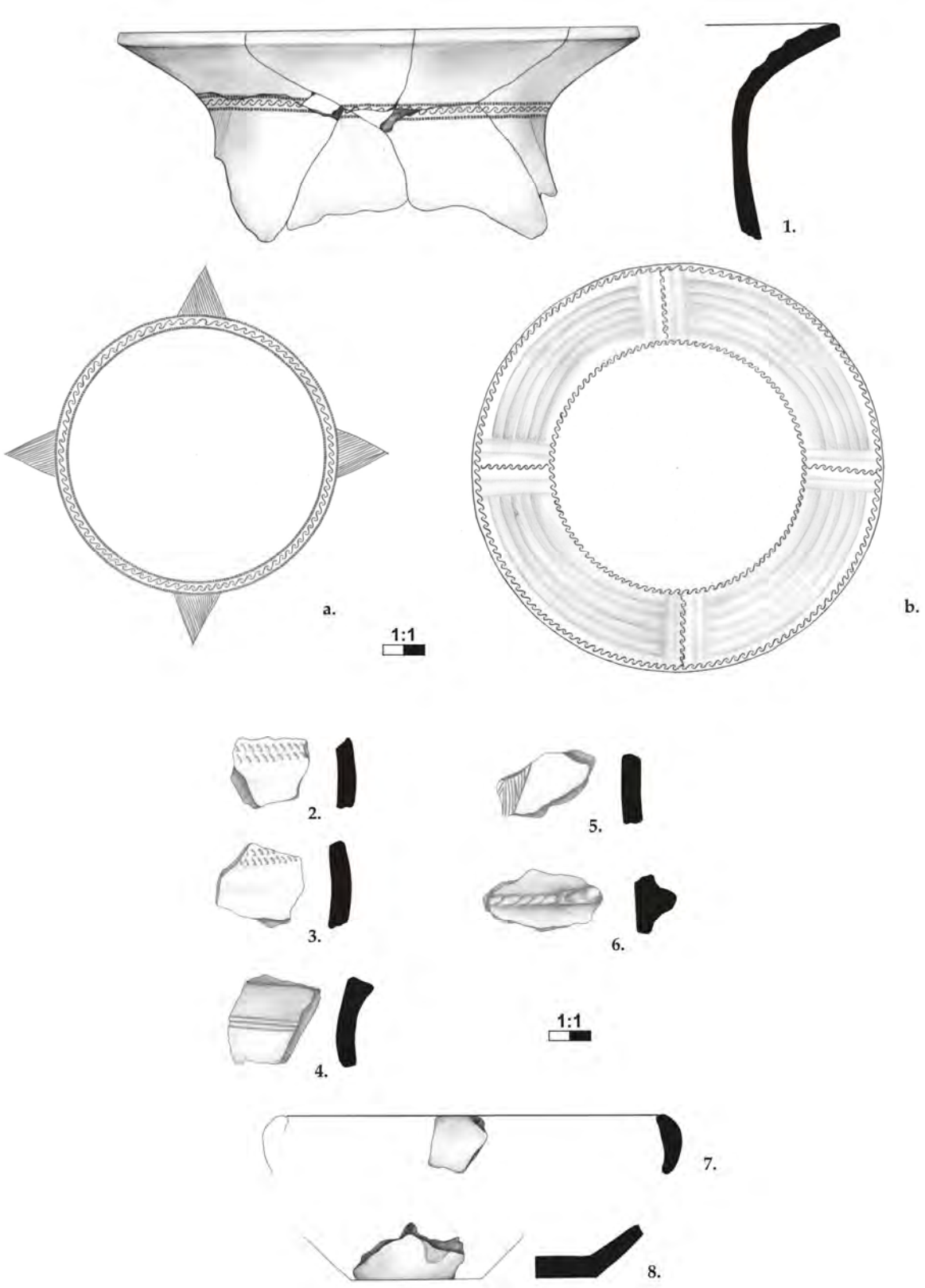
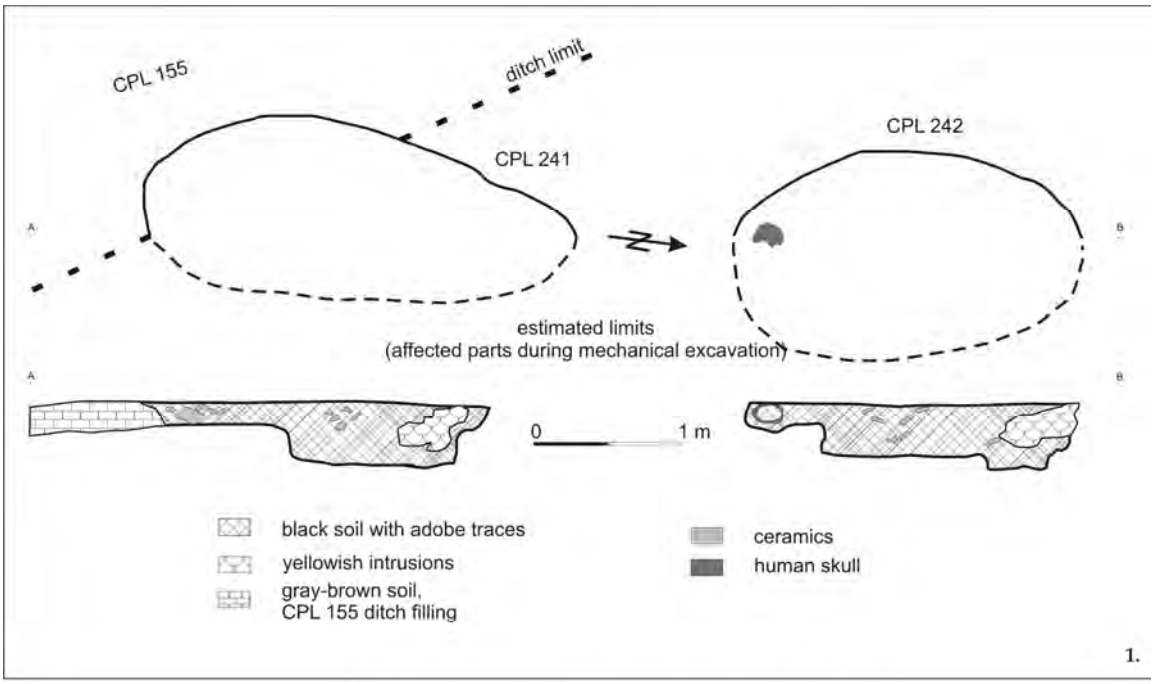


Fig. 16. CPL 186 / 004H (area Individual 14): 1. Fragmentary pot (with the decoration represented unfolded, a – outside and b – inside, pot's rim); 2–8. Typical ceramic fragments.
CPL 186 / 004H (zona Individ 14): 1. Vas fragmentar (cu reprezentarea decorului desfășurat, a – exterior și b – interior, marginea vasului); 2–8. Fragmente ceramice tipice.



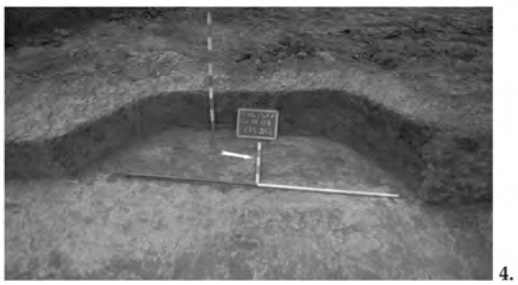


Fig. 17. CPL 242 (area Individual 15) and neighbouring complexes (CPL 155, CPL 241): 1. Plan. CPL 242: 2–4. Image taken during the research of the complex.
CPL 242 (zona Individ 15) și complexe învecinate (CPL 155, CPL 241): 1. Plan. CPL 242: 2–4. Imagini din timpul cercetării complexului.

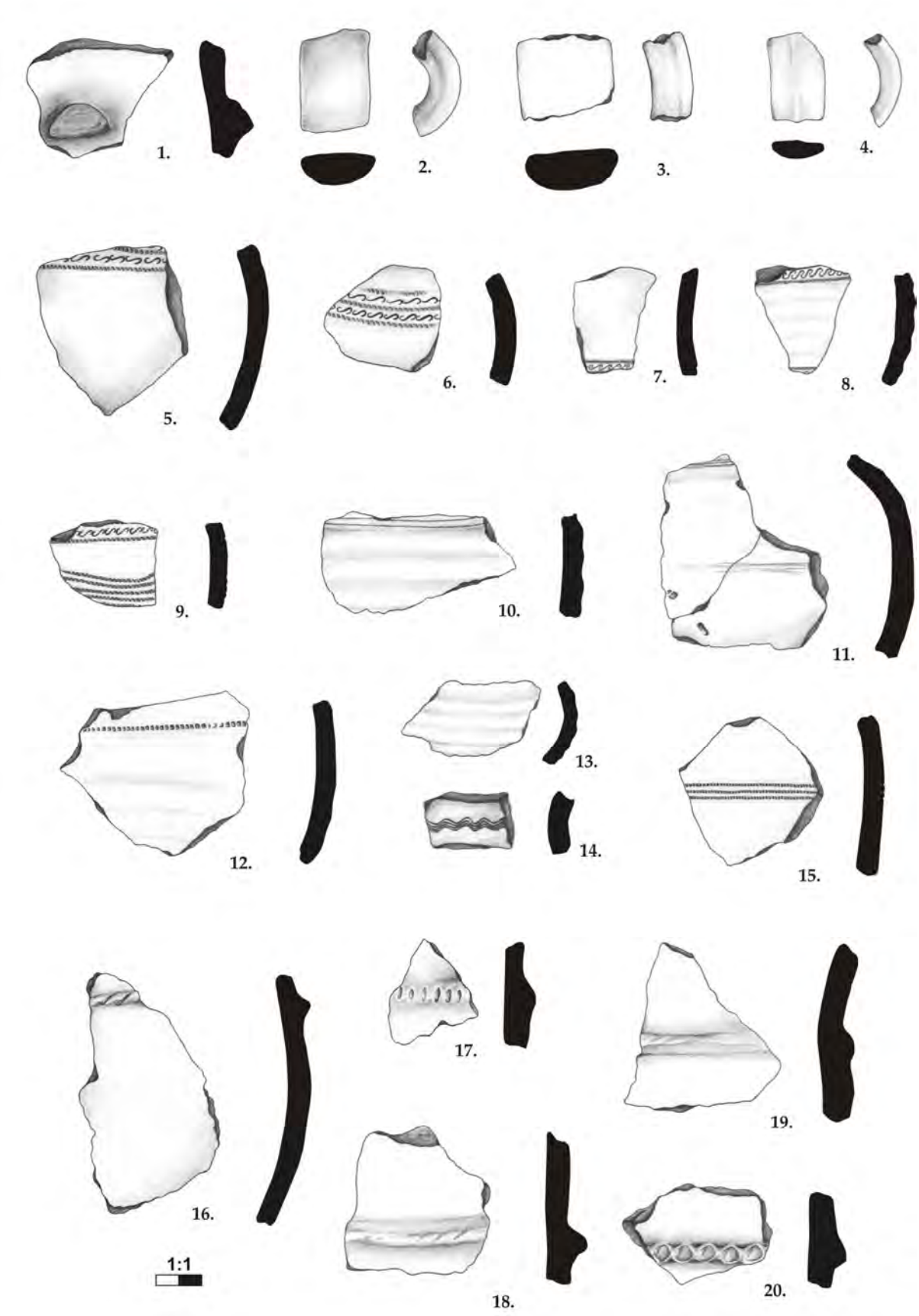


Fig. 18. CPL 242 (area Individual 15): 1–20. Specific ceramic material.
CPL 242 (zona Individ 15): 1–20. Fragmente ceramice tipice.

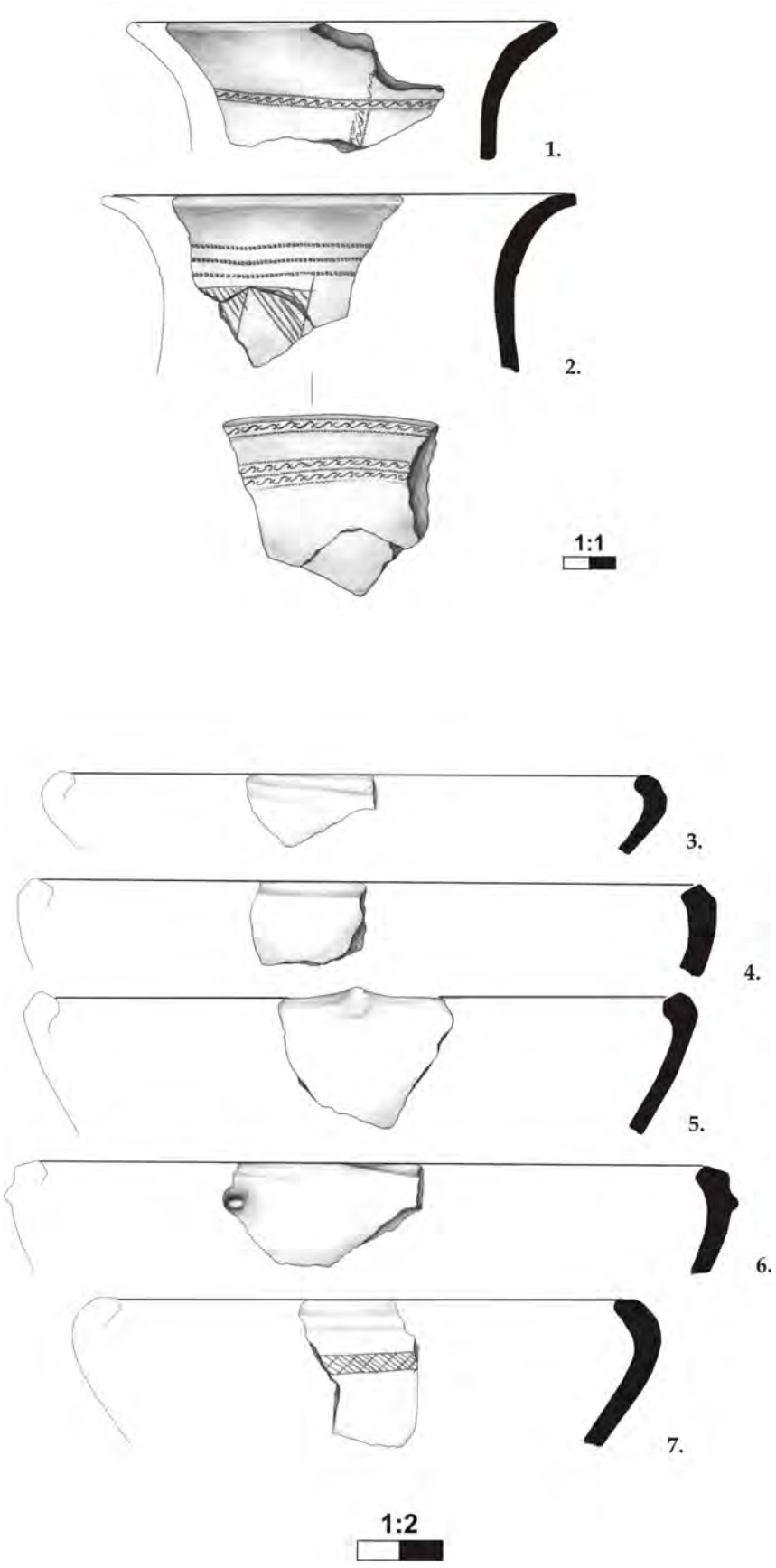


Fig. 19. CPL 242 (area Individual 15): 1–7. Specific ceramic material.
CPL 242 (zona Individ 15): 1–7. Fragmente ceramice tipice.

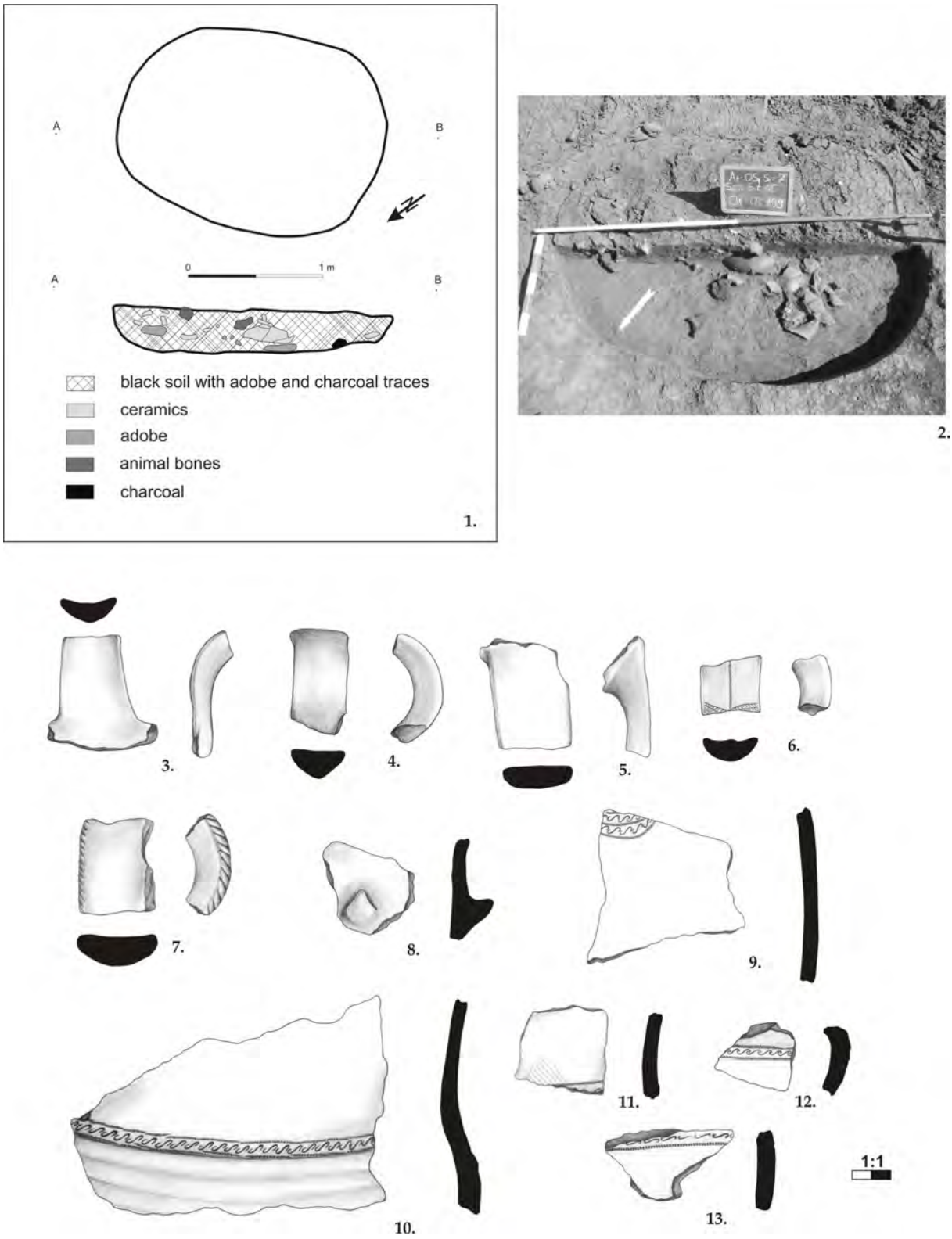


Fig. 20. CPL 199 (area Individual 16): 1. Plan; 2. Image taken during the research of the complex; 3–13. Specific ceramic material.
CPL 199 (zona Individ 16): 1. Plan; 2. Imagine din timpul cercetării complexului; 3–13. Material ceramic tipic.

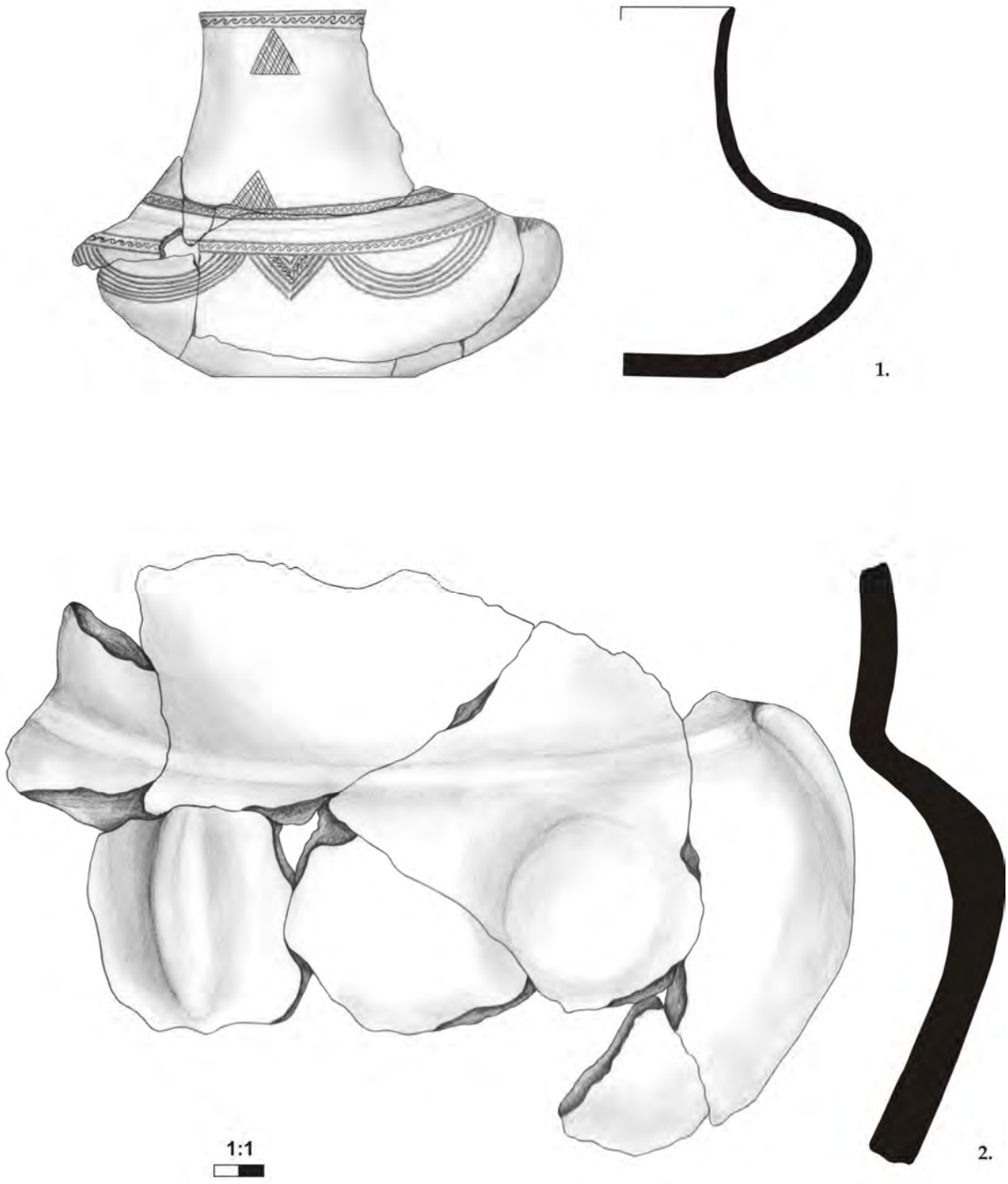


Fig. 21. CPL 199 (area Individual 16): 1–2. Fragmentary pots.
CPL 199 (zona Individ 16): 1–2. Vase fragmentare.

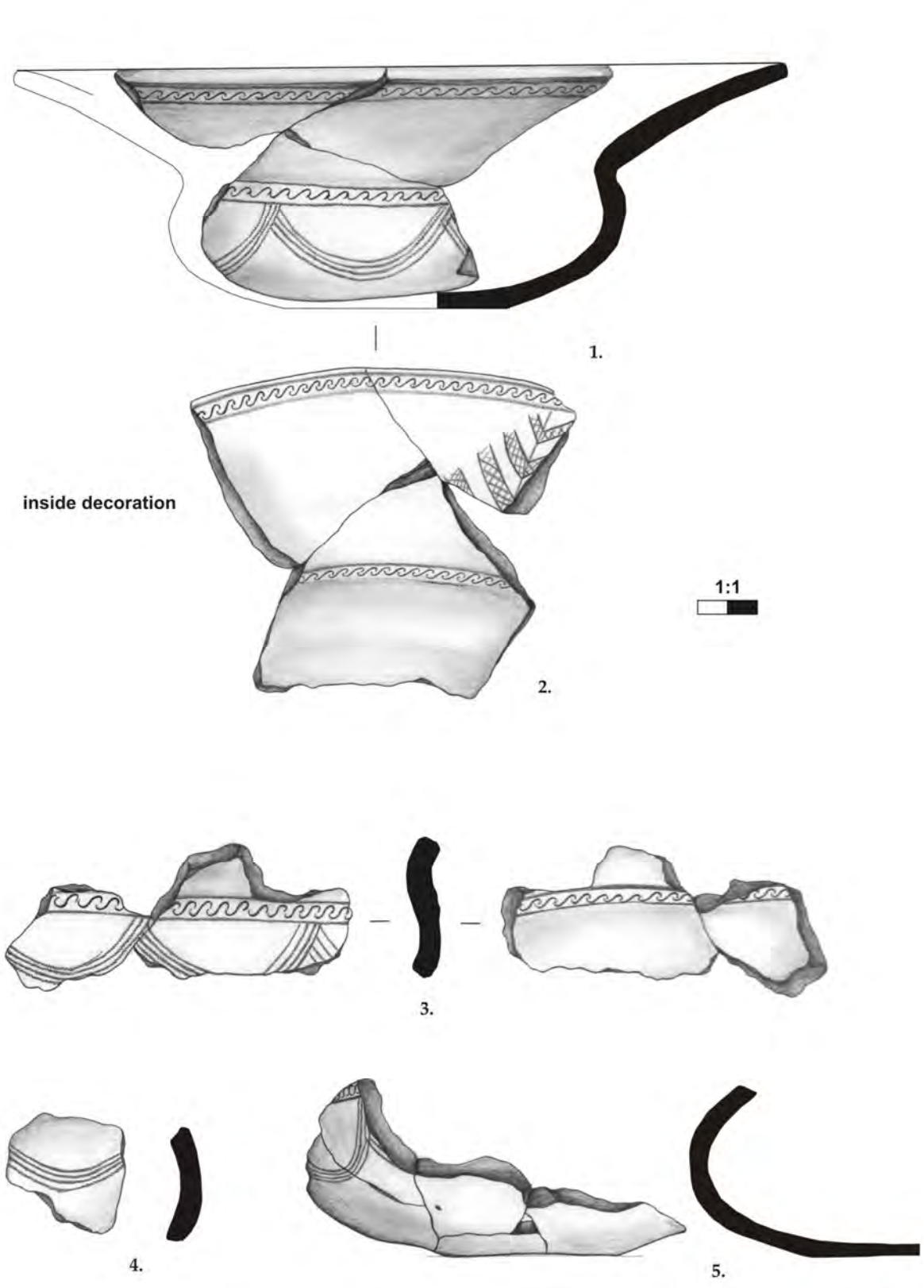


Fig. 22. CPL 199 (area Individual 16): 1. Fragmentary pot (partially restored); 2–4. Other fragments from the unrestored pot.
CPL 199 (zona Individ 16): 1. Vas fragmentar (restaurat parțial); 2 – 4. Alte fragmente ceramice din vasul nerestaurat.

Assessment of an Iron Age skeletal assemblage from Romania, Tărtăria *Podu Tărtăriei vest* (Alba County, Romania)

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Marius ILIE**

Abstract: *A new archaeological site was discovered in 2012 in Romania in the river Mureș Valley, at Tărtăria (Alba County). Researchers have been able to date it during the first period of the Iron Age (middle Hallstatt, Basarabi culture). Excavation has revealed a collective burial containing the remains of seven individuals (six of which were articulated and a seventh only partially represented). Due to the very poor preservation and extreme degree of fragmentation of the material, anthropological analysis could only determine age at death for some of the individuals. This article discusses this common burial together with other individual funerary features have also been discovered in one of the trenches bordering the site. The skeletal assemblage from Tărtăria has analogies in other contemporary assemblages recovered from Hungary and Serbia and remains particularly important for our understanding of funerary rites during the early Iron Age in the Carpathian basin.*

Rezumat: *Un nou sit arheologic a fost descoperit în anul 2012 pe Valea Mureșului, la Tărtăria (jud. Alba). Datat de autorii cercetării în prima epocă a fierului (Hallstatt mijlociu, cultura Basarabi), așezarea prezintă o caracteristică specială și anume descoperirea în arealul acesteia a unui mormânt colectiv în care au fost depuse șapte schelete umane (șase aflate în conexiune anatomică și un schelet parțial reprezentat). Din cauza stării precare de conservare a materialului scheletic și/sau a gradului de fragmentare destul de ridicat, expertiza antropologică a permis doar estimarea vârstei la deces pentru unii dintre indivizi. Pe unul dintre șanțurile de delimitare a sitului, au fost descoperite și alte complexe funerare individuale, discutate, de asemenea, aici. Deosebit de interesant din punct de vedere al fenomenului funerar din perioada incipientă a epocii fierului din spațiul intracarpatic, materialul scheletic de la Tărtăria își găsește analogii cu alte serii de schelete descoperite în arealul extracarpatic din Ungaria sau Serbia, aflate pe același palier cronologic.*

Keywords: *middle Hallstatt (Basarabi culture), mass graves, age at death estimation.*

Cuvinte cheie: *Hallstatt mijlociu (cultura Basarabi), mormânt colectiv, estimarea vârstei la deces.*

◈ Introduction. Materials and methods

Following archaeological research around the village of Tărtăria (Sălișstea commune, Alba County) a mass grave containing six articulated human skeletons and a skull[1] was discovered (feature 114, fig. 1). The individuals were labelled M1-M7. Additional human remains were recovered from the southern part of the site as well as several pits, likely belonging to several other funerary features (M8-M16). Based on the associated material, researchers were able to date the site to the first Iron Age (middle Hallstatt, Basarabi culture, 9/8th-7th c. B.C.) (C. Borș 2013; C. Borș *et alii* 2014; L. Rumega-Irimuș 2015). Unfortunately, once excavated and washed in laboratory conditions, the skeletal material turned out to be

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[1] Several poorly preserved post-cranial elements were also recovered with M7 (see below).

extremely fragmented, resulting in specimens with a size range of 2 mm-20 mm (fig. 2), severely limiting our options for analysis. A first result of this was the impossibility of siding anatomical elements in most cases.

The problems posed by the high degree of fragmentation were compounded by the very poor surface preservation of the specimens, a situation visible *in situ* where site staff confirmed that several specimens were already friable and could not be recovered. Thus affected by taphonomic factors in the soil, most of the assemblage has been rated 4 (fig. 3) on the M. Brickley and J.I. McKinley (2004, p. 14-17) scale of surface preservation.

A high degree of fragmentation of the innominate and skull meant that age at death for most individuals could be determined almost exclusively by analysing the decidual or permanent dentition. For subadult individuals, eruption stages were analysed according to C.F.A. Moorrees *et alii* (1963) and D.H. Ubelaker (1980, p. 46-47), while wear stages of the molars were used to determine age at death where permanent teeth were identified (A.E.W. Miles 1962). In some cases where more complete specimens were present, epiphyseal fusion stages (D.H. Ubelaker 1980, p. 53) and auricular surface analysis according to the J.L. Buckberry and A.T. Chamberlain (2002) method (involving rating various aspects of the auricular surface according to a set scale and assigning an age interval according to the compound score of these marks) were also used in determining age at death.

◈ Skeletal inventory description

M1: The skeletal remains of two different individuals were identified. The first (M1a) is poorly represented anatomically, with very good surface preservation showing no obvious post-mortem changes (score 1 on the M. Brickley and J.I. McKinley scale) and a high degree of fragmentation. The skull was represented by numerous temporal bone fragments (under 50 mm), together with a maxilla and mandibular symphisis fragments. Post-cranial elements are represented by a distal humerus, one femur and one fibula fragment, all lacking any elements to help in siding.

Age at death was estimated at 15-18 years old (D.H. Ubelaker 1980; C.F.A. Moorrees *et alii* 1963).

The second individual (M1b) is represented by nine teeth (see below, tab. 1) and has an estimated age at death of 6-7 years old.

M2: Poorly represented anatomically, with a surface preservation grade 4 and very highly fragmented. The skull was represented by frontal and parietal bone fragments (nine each), four temporal and two occipital fragments. The viscerocranium is absent, while the mandible is represented by a right vertical ramus fragment. Post-cranial elements are represented by a humeral head, four humerus and one femur diaphysis fragments and a middle phalanx from the hand. No siding was possible.

Age at death was estimated at 12-13 years old (C.F.A. Moorrees *et alii* 1963).

M3: Poorly represented anatomically, with a surface preservation grade 3 and very highly fragmented. The skull was represented by 11 frontal, 14 parietal, five temporal and four occipital fragments, together with a left zygomatic. The mandible is represented by a symphisis, right vertical ramus and condyle fragments. With the exception of an atlas fragment, a capitate and a third metacarpal, no other post-cranial elements were recovered.

Age at death was estimated at 18-25 years old (A.E.W. Miles 1962).

A single cavity was identified on RM_1, affecting two-thirds of the tooth all the way down to the root (fig. 4).

M4: Poorly represented anatomically, with a surface preservation grade 2 and very highly fragmented. The skull was represented by seven frontal, 15 parietal and one petrous pyramid fragments. The mandible is represented by a symphisis fragment, the right mandibular condyle and the right mandibular body: the broken roots of the incisors are still present, as are the canine and premolars. Seven fragment of a femoral diaphysis were also recovered.

Age at death was estimated at 9 years ± 24 month (D.H. Ubelaker 1980).

M5: Poorly represented anatomically, with a surface preservation grade 3 and very highly fragmented. The skull was represented by nine frontal, one parietal, one temporal, two petrous pyramids and one occipital fragments. The mandible is represented by two corpus fragments. Post-cranial elements are represented by several diaphysis fragments (17 femur, two right distal humerus and six ulna), as well as one fragment of the left calcaneus, one fragment of a metacarpal and six fragments of hand phalanges.

Age at death was estimated at 17-25 years old (A.E.W. Miles 1962).

M6: Poorly represented anatomically, with a surface preservation grade 4 and very highly fragmented. The skull was represented by 11 frontal, 12 parietal, four temporal and five occipital fragments, together with a left maxillary molar fragment (tab. 1). The mandible is represented by one condyle, two vertical ramus and one body fragments. Post-cranial elements were represented by a nearly complete left humeral diaphysis, a right humerus distal diaphysis fragment, two femoral heads, 12 femur diaphysis fragments (two of which were sided as belonging to the right femur), one fibula diaphysis fragment, one distal tibia epiphysis, one calcaneus and metatarsal fragment and another two fragments belonging to phalanges. The innominate was represented by 15 unidentified fragments together with two acetabulum and one ilium fragments, the latter including the auricular surface.

Based on the absence of the auricular sulcus, biological sex is probably male (J.E. Buikstra, D.H. Ubelaker 1994, p. 18-19). The recovered left auricular surface showed a morphology typical to phase III (score 10) on the J.L. Buckberry and A.T. Chamberlain (2002) scale, offering an age at death interval of 16-65 years old with an average of 37 years old. Estimation of age at death through the A.E.W. Miles (1962) method of molar wear indicates a narrower interval of age at death of 18-20. The two values lead to the conclusion that M6 was an adolescent/young adult.

Pathological lesions typical of *cribra orbitalia* were identified on the left orbital arch (fig. 5). One mandible fragment and three molars belonging to *Sus scrofa*/*Sus domesticus* were also identified.

M8, M9 & M10: Skeletal remains recovered from features CPL 004F, CPL 004H and CPL 004K were so poorly preserved that no analysis was possible.

At the bottom of sondage CPL 004H specimens belonging to three different skulls attributed to M11-M13 were recovered.

M11: Is represented by 12 unidentifiable skull fragments with a size range of 5-20 mm. Based on the thickness of these fragments the individual can be assumed to have fitted in the subadult/adult category.

M12: The following skull fragments, with a size range of 10-30 mm (most of which are 10 mm <), were recovered: four frontal, seven parietal and 13 unidentified. Based on the thickness of these fragments the individual can be assumed to have fitted in the subadult/adult category.

M13: Poorly preserved, with no elements recovered from site.

M14: Skeletal remains recovered from pit CPL 186 and the fill of trench 004K. Poorly represented anatomically, with a surface preservation grade 5 and very highly fragmented. The skull was represented by six frontal, seven parietal, six temporal and one occipital fragments, together with the right zygomatic, two mandible and five maxilla fragments. Post-cranial elements are represented by two ulna diaphysis fragments, one femoral lateral condyle, one diaphysis fragment of the left tibia and several fragments of the right tibia: two diaphyses, the tibial plateau and another 15 unidentified fragments.

Age at death was estimated at 30 years (A.E.W. Miles 1962) based on the wear stage of a single molar.

M15: Skeletal remains recovered from pit CPL 242. Poorly represented anatomically, with a surface preservation grade 4 and very highly fragmented. The skull was represented by five frontal, 13 parietal and six occipital fragments, together with the 10 unidentified fragments. The mandible is represented by one symphisis and one right vertical ramus fragments. Post-cranial elements are represented by 37 femur diaphysis fragments (two of which have been attributed to the right femur). A wormian bone, most likely lambdoid, was also identified.

Age at death was estimated at 14-18 years old (A.E.W. Miles 1962).

M16: Skeletal remains recovered from pit CPL 199, during the post-excavation analysis. Poorly preserved.

Skeleton	Dental inventory	No.
M1	M1a: I^1-I^2, P^1, M^1-M^2 left; I^1-M^1 right; I_1-M_3 left; I_1-I_2, P_1-P_2 right; M1b: I^1, M^2 left; I^1, M^2 right; M_1-M_2 left; M_1-M_2 right and 1x C#, unsided	23 9
M2	M^1-M^2 left; M^2 right and 1x P, unsided; M_1-M_2 left; $C_\#$, M_1-M_2 right and P_1-P_2, unsided	11
M3	I^1-M^3 left; I^2-M^3 right; I_2-M_3 left; I_1-M_3 right	30
M4	I^1-P^2 left; I^1-P^2 right and M^1, unsided; I_1-M_2 left; I_1-M_2 right and 4x decidual molars and 3x M3 crowns, unsided	28
M5	$C_\#$-M_2, unsided	5
M6	2x P1 and 1x P2, with a broken root (unsided) and 6x molars with broken roots, in alveoli, 2x M3 crowns with underdeveloped roots	11
M7	N.A.	0
M8	N.A.	0
M9	N.A.	0
M10	N.A.	0
M11	N.A.	0
M12	N.A.	0
M13	N.A.	0
M14	2x I^1, 2x $C_\#$, $C^\#$ left, 3x P1, 3x P2, 2x M1, 3x M2 and 2x unidentified molar fragments, (highly degraded teeth)	16
M15	2x C#, 2x P1, P2 right, 1x M1 și 2x M2	8
M16	N.A.	0

Tab. 1. Dental inventory of the Tărtăria *Podu Tărtăriei vest* skeletal assemblage.
Inventarul dentar al indivizilor descoperiți la Tărtăria *Podu Tărtăriei vest*.

◈ Results and discussion

Despite attempts at conservation, the highly advanced state of degradation of the material, together with logistical difficulties pertaining to the nature of the site, meant that fragmentation of the material could not be avoided. In hindsight it becomes evident that *in situ* action was necessary to preserve the assemblage (eg. specialized adhesive such as Paraloid B-72 could have been applied on fragile bones in order to avoid further fragmentation).

All of the 16 analyzed individuals[2] are poorly represented on an anatomical level. Post-cranial bones were very poorly preserved with the exception of few skull fragments and long bone diaphyses, and the occasional specimen which could be identified as belonging to the axial skeleton. Cranial fragments and teeth make up the most significant part of the assemblage. One case (M7) yielded faunal elements as well in the form of three *Sus scrofa*/*Sus domesticus* molars.

The absence of diagnostic features on most bones made determination of biological sex impossible, with the exception of M6 which was determined as 'probably male' based on the absence of the auricular sulcus in the one ilium fragment recovered. Height could not be estimated due to any intact long bones not being recovered.

The situation described above resulted in a limitation of the information which could be extracted from the bones regarding age at death (tab. 2). Two juveniles, three adolescents, three adolescents/young adults, three subadults/adults and a young adult were identified. With the exception of the one adult (M14, 30 years old), all other individuals were under 30 years old.

Investigation of pathological bone changes have revealed a considerable carious lesion on the right mandibular molar of skeleton M3 and a case of healed *cribra orbitalia* on skeleton M7. *Cribra orbitalia* is characterized by sieve-like lesions on the orbital roof and is most commonly associated with iron deficiency anaemia (V.A. Walker *et alii* 2009, p. 109), though other aetiologies have been put forward such as inflammatory conditions or osteitis (U. Wapler *et alii* 2004, p. 335). Both carious lesions and *cribra orbitalia* are some of the most frequently encountered palaeopathological lesions in human remains. While the identification of a single case does not allow for generalization, it does seem likely that the Tărtăria individuals were no strangers to dietary deficiencies associated with these pathological conditions.

The most interesting part of the assemblage is represented by the mass burial, a fairly uncommon situation in the Hallstatt period. As in most other periods, the dead were reserved a specially defined place, called necropolis. However, for the early period of the Iron Age, there are numerous discoveries of a different funerary character[3]: depositions within the settlement of partial or fully articulated skeletons. It should be noted that it seems no strict rules regarding the number of dead or their orientation in a burial were observed (S.C. Ailincăi 2008, p. 30).

Within the Carpathian basin several other similar collective burials have been discovered. Amongst the most well-known is the one in Pusztataskony-Ledence 1 (Kalakača culture), Hungary. As in the case of the Tărtăria (Basarabi culture) mass grave, the depositions here are represented only by partial skeletons, despite the high number of buried individuals (at least 20) (A. Király *et alii* 2013). A similar discovery was found at Hrtkovci-Gomolava in the Serbian province of Voivodina, belonging to the Bosut III culture which is contemporary with

[2] Of which only 12 could be recovered from site.

[3] We have avoided describing these depositions as 'non-funerary,' which seems inappropriate in the case of in settlement deposition.

the Basarabi culture in Romania. Unlike the Tărtăria and Pusztataskony-Ledence 1 cases, at Gomolava two collective burials containing complete skeletons together with disarticulated anatomical elements were discovered, containing an impressive 78 individuals (N. Tasić 1974, p. 465-466). In Romania, another mass burial containing 13 individuals was discovered at Jurilovca (Tulcea county), ancient Orgame/Argamum, belonging to the Babadag culture (8th-7th c. B.C.) (S.C. Ailincăi *et alii* 2003, p. 308).

The nature of the burial (mass grave containing articulated skeletons), together with the lack of information regarding biological sex, height or pathologies make us recommend the use of DNA analysis as the best way of obtaining more information, especially regarding kinship (fig. 6).

Skeleton	Sex	Age at death (in years)	Age category	Pathology	Non-metric traits
M1a	–	15-18	adolescent	–	–
M1b	–	6-7	juvenile	–	–
M2	–	12-13	adolescent	–	–
M3	–	18-25	adolescent/young adult	Carious lesion	–
M4	–	9	juvenile	–	–
M5	–	17-25	adolescent/young adult	–	–
M6	♂	18-20	adolescent/young adult	–	–
M7	–	> 13-19	subadult/adult	*Cribra orbitalia*	–
M8	–	–	–	–	–
M9	–	–	–	–	–
M10	–	–	–	–	–
M11	–	–	subadult/adult	–	–
M12	–	–	subadult/adult	–	–
M13	–	–	–	–	–
M14	–	30	young adult	–	–
M15	–	14-18	adolescent	–	Wormian bone
M16	–	–	–	–	–

Tab. 2. The Tărtăria *Podu Tărtăriei vest* assemblage.
Principalele caracteristici ale indivizilor descoperiți la Tărtăria *Podu Tărtăriei vest*.

◈ **Acknowledgements**

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◈ References

S.C. Ailincăi 2008 — The place for the dead in the Early and Middle Iron Age Lower Danube area, in V. Sîrbu, D. Lucian Vaida (eds.), *Funerary practices of the Bronze and Iron Ages in Central and South-Eastern Europe*, Proceedings of the 9th International Colloquium of funerary archaeology, Bistrița, Romania, may 9th-11th, Editura Mega, Cluj-Napoca, p. 9-33.

S.C. Ailincăi *et alii* 2003 — S.C. Ailincăi, N. Mirițoiu, A. Soficaru, O groapă cu oseminte umane atribuită culturii Babadag descoperită în nivelul precolonial de la Orgame (com. Jurilovca, jud. Tulcea), *ArhMold*, XXVI, p. 307-324.

C. Borș 2013 — A new site of the Basarabi period on the Mureș Valley: Tărtăria-Podu Tărtăriei Vest, in V. Sîrbu, R. Ștefănescu (eds.), *The Thracian and their neighbours in Bronze and Iron Ages. Necropolises, cult places, religion, mythology*, Proceedings of the 12th International Congress of Thracology, Târgoviște, 10th-14th September 2013, vol. II, Muzeul Brăilei, Editura Istros, Brăila, p. 447-462.

C. Borș *et alii* 2014 — C. Borș, L. Irimuș, V. Rumega, S. Dobrotă, C. Rișcuța, Un nou sit de tip Basarabi. Raport arheologic preliminar asupra cercetărilor arheologice preventive de la Tărtăria – Podu Tărtăriei vest (campania 2012), *CA*, 20, p. 9–102.

M. Brickley, J.I. McKinley (eds.) 2004 — *Guidelines to the standards for recording human remains*, IFA Paper, No. 7, British Association for Biological Anthropology and Osteoarchaeology, Southampton, Hampshire, p. 62.

J.L. Buckberry, A.T. Chamberlain 2002 — Age estimation from the auricular surface of the ilium: a revised method, *American Journal of Physical Anthropology*, 119 (3), p. 231-239.

J.E. Buikstra, D.H. Ubelaker (eds.) 1994 — Standards for data collection from human skeletal remains, *Arkansas Archaeological Survey Research*, 44, p. 206.

Király *et alii* 2013 — A. Király, K., Sebők, Z.K. Zoffmann, G. Kovács, Early Iron Age 'mass graves' in the Middle Tisza Region: investigation and interpretation, in *Irreguläre' Bestattungen in der Urgeschichte: Norm, Ritual, Strafe …?*, Akten der Internationalen Tagung in Frankfurt A. M. vom 3. bis 5. Februar 2012, herausgegeben von Nils Müller-Scheeßel, Römisch-Germanische Kommission, Frankfurt A. M. Eurasien-Abteilung, Berlin, des Deutschen Archäologischen Instituts Kolloquien zur Vor- und Frühgeschichte, Band 19, Dr. Rudolf Habelt GmbH Bonn, p. 307-326.

A.E.W. Miles 1962 — The dentition in the assessment of individual age in skeletal material, in D.R. Brothwell (ed.), *Symposia of the Society for the Study of Human Biology*, *Dental anthropology,* Volume V, Pergamon Press, London, p. 191-209.

C.F.A. Moorrees *et alii* 1963 — C.F.A. Moorrees, E.A. Fanning, E.E. Hunt Jr., Formation and resorption of three deciduous teeth in children, *American Journal of Physical Anthropology*, 21 (2), p. 205-213.

L. Rumega-Irimuș 2015 — A collective grave and other contexts containing human remains discovered in the Hallstatt-period site at Tărtăria – Podu Tărtăriei vest (Alba County), *SP*, 12, p. 161-194.

N. Tasić 1974 — The Early Iron Age in Vojvodina. The Bosut Group, in B. Bruckner, B. Jovanović, N. Tasić (eds.), *Praistorija Vojvodine*, Institut za Izucavanje Istorije Vojvodine, Saves Arheoloskih Drustava Jugoslavije, Novi Sad, Monumenta Archaeologica, 1, p. 562.

D.H. Ubelaker 1980 — *Human skeletal remains: excavation, analysis, interpretation, Manuals on archaeology,* 2nd edition, Washington, DC, Smithsonian Institution, p. 115.

V.A. Walker *et alii* 2009 — V.A. Walker, P.L. Bathurst, R.R. Richman, R. Gjerdrum, T. Andrushko, The causes of porotic hyperostosis and cribra orbitalia: a reappraisal of the iron-deficiency-anemia hypothesis, *American Journal of Physical Anthropology*, 139 (2), p. 109-135.

U. Wapler, *et alii* 2004 — U. Wapler, E. Crubézy, M. Schultz, Is cribra orbitalia synonymous with anemia? Analysis and interpretation of cranial pathology in Sudan, *American Journal of Physical Anthropology*, 123 (4), p. 333-339.

Fig. 1. Overview, *in situ*, of collective tomb discovered at Tărtăria (photo by Luciana Irimuș, 2012, © Corina Borș & NRMH).
Privire de ansamblu, *in situ*, a mormântului colectiv descoperit la Tărtăria (fotografie realizată de Luciana Irimuș, 2012, © Corina Borș & MNIR).

Fig. 2. High degree of fragmentation of the skull of M2.
Gradul ridicat de fragmentare al craniului din M2.

Fig. 3. Taphonomic changes at skull bones (endo- and exocranian) at the individual of M2.
Modificări tafonomice la nivelul oaselor craniene (endo- și exocranian) la individul din M2.

Fig. 4. Carious lesions identified at the first right mandibular molar (M3 individual).
Leziuni carioase identificate la nivelul primului molar mandibular dreapta (individul M3).

Fig. 5. Healed *cribra orbitalia* at left *pars orbitalis* on the M7 individual.
Cribra orbitalia vindecată la nivelul *pars orbitalis* stânga al individului M7.

Fig. 6. Subfossil DNA analysis of individuals assign to M5 and M6 can edify us on the relationships of biological relatedness (photo by Luciana Irimuș, 2012 © Corina Borș & NRMH)
Analiza ADN-ului subfosil al indivizilor atribuiți M5 și M6 ne poate edifica asupra relațiilor de înrudire biologică (fotografie realizată de Luciana Irimuș, 2012, © Corina Borș & MNIR).

Anthropic impact on the archaeological sites reflected in geospatial analysis. Study case: Ilfov County

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Abstract: *The spatial dimension of human behavior is an important research field in archaeology. The methods and techniques related with geomatics, especially GIS (Geographical Information System), are useful tools for archaeologists. The present study aims to analyze the anthropic impact on the archaeological sites in the Ilfov County, based on the data that covers a 150 years period (1864 – 2015) are used. Along with assessing anthropic impact, this paper presents a methodology of work which can be used in urban planning, in order to minimize uncontrolled losses on heritage.*

Rezumat: *Dimensiunea spațială a comportamentului uman a fost și este una dintre direcțiile importante de studiu în arheologie. Metodele și tehnicile de lucru care țin de domeniul geomaticii, în special GIS, sunt pentru arheologi un instrument util cu ajutorul cărora se pot examina seturi de date voluminoase în context spațial, abordare propusă și în articolul de față. Studiul prezentat a avut ca scop o analiză a impactului antropic, în ultimii 150 ani (1864 – 2015), asupra siturilor arheologice din județul Ilfov, utilizând seturi de date disponibile în spațiul public. Concomitent cu evaluarea impactului antropic, lucrarea de față prezintă o metodologie de lucru care, utilizată frecvent în alte domenii, în etapele de analiză a peisajului poate ajuta la diminuarea pierderilor în domeniul patrimoniului.*

Keywords: *Ilfov County, archaeological sites, anthropic impact, GIS analyses.*

Cuvinte cheie: *Județul Ilfov, situri arheologice, impactul antropic, analize GIS.*

◈ Introduction

The spatial dimension of the human behavior is one important topic in archaeological research. The methods and techniques used in geomatics, especially GIS, are a very useful instrument for archaeologists, allowing them to examine large sets of data in spatial context.

This paper aims to analyze the anthropic impact, in the last 150 years (1864-2015), upon archaeological sites from Ilfov County. The data regarding the archaeological sites were taken from two data bases for archaeological sites in Romania, the National Archaeological Record of Romania (RAN)[1] and the List of Historical Monuments (LMI)[2]. Both of them are managed by the National Institute for Heritage. Another source of data was represented by the archaeological reports of the Ilfov County Department for Culture and National Heritage (DJC Ilfov). The archaeological reports for the years 2008–2009 were used for this study[3].

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[1] RAN is a public database, until recently managed by the Institute of Cultural Memory (CIMEC); data provided can be found at http://ran.cimec.ro.

[2] LMI is updated every five years; the last update was made in 2010 and is available online at http://www.cultura.ro/page/17.

[3] Data provided by the Ilfov County Department for Culture are being processed; so far, only the data for 2008 year were finalized.

Ilfov County covers an area of 1583 km² (the area calculated according to GIS is 1564.2 km²). Its position around the capital city of Romania had many effects during time and influenced its evolution, not exactly in a positive way. This is how the successive changes in the administrative-territorial organization of the county in the last 150 years added or eliminated large areas of the county territory (M.Ș. Florea 2015, p. 343). With such a dynamic, any statistic applied to this county should take in consideration these facts.

A series of facilities already encouraged this study. Many of the used data sets, official and unofficial, are available on the internet for free. More data were added through the Government related institutions (ANCPI[4], DTM[5], DJC[6], town halls) who kindly offered the requested information. Least but not last, the easy access to open source softs from the geomatics[7] area allowed the data integration, management and interrogation. The official data is offered by RAN, LMI, ANCPI, DTM and CORINE[8]. The unofficial data, accessed through specialized sites, often represent the results obtained mostly within research projects or through non-government organizations or even personal achievements. The following sources were used entirely or partially: *Charta 1864*[9], *Historical Maps of the Habsburg Empire*[10], *Planurile Directoare de Tragere*[11], *GEOIDEA*[12]. Among the personal projects from web we can mention the following address http://www.pug-puz.ro/[13] from where the data regarding the General Urban Plans (PUG) of Ilfov County were filtered.

◈ The geographic and administrative frame

Located in the South-East part of Romania, in the middle of the Romanian Plain, Ilfov County is surrounded by Dâmbovița County to the North-West, Prahova County to the North and Ialomița County to the North-East. Giurgiu County to the South-West and Călărași County to the South-East represent mostly territories of the former Ilfov County which was previously spreading up to Danube River.

Regarding the relief, Ilfov County belongs to the Romanian Plain with its three distinct sub-divisions, *Vlăsia Plain* in the North side, *Burnas Plain* in the South-East side and *Mostiștea Plain* in the East side. A comprehensive description of the area and its particularities was performed by Vintilă Mihăilescu in the paper *Vlăsia și Mostiștea. Evoluția*

[4] National Agency for Cadaster and Land Registration.

[5] Directorate for Military Topography.

[6] Ilfov County Department of Culture and National Heritage.

[7] The most used for the present study was QGIS program that has numerous applications for the spatial analysis in general and applications dedicated for archaeology in particular (http://www.qgis.org/en/site/).

[8] Coordination of Information on the Environment. 2000 edition - http://www.geo-spatial.org/download/datele-corine-landcover-reproiectate-in-stereo70; 2006 edition - http://www.eea.europa.eu/ data-and-maps/data/clc-2006-vector-data-version.

[9] Digital approaches in cartographic heritage: digitizing, georeferencing and publishing on web of the "Charta României Meridionale" - http://www.charta1864.ro.

[10] Several projects were combined into a single result, namely digitization of the historical maps of the Habsburg Empire; available at http://mapire.eu/en.

[11] http://www.geo-spatial.org/download/planurile-directoare-de-tragere.

[12] http://geoidea.ethz.ch/ (data were used by Web Map Services method).

[13] The site is not permanently operational and some data may be removed by the owner (accessed during September - October 2015).

geografică a două regiuni din Câmpia Română: *Mostistei and Vlasiei plains are part from the central area of Romanian plain, were the largest number of valleys with waters was gathered and with a peninsula with more atmospheric humidity, a largest advancement of the forest toward the Danube, between two steppe lands and with the largest agglomeration of the villages and population from the hills and Danubian meadow*. (V. Mihăilescu 1925, p. 3). In the above mentioned paper there are also the limits of the two sub-divisions of the Romanian Plain (V. Mihăilescu 1925, p. 5, fig. 1; p. 9, fig. 2).

The hydrographic network cuts the county in a diagonal line, from North-West to South-East, having Dâmbovița and Colentina as main artery, Sabarul and Ciorogârla in South, Pasărea, Cociovalиștea and Vlăsia in North. The hydrographic network is completed by the river edge type lakes (Bălteni, Snagov, Căldăruşani) from Snagovului Plain (I. Ujvári 1972, p. 467; P.V. Coteţ 1976, p. 188; vezi fig. 1).

Nowadays, Ilfov County counts 105 localities (from which 8 towns - Bragadiru, Buftea, Chitila, Măgurele, Otopeni, Pantelimon, Popești Leordeni and Voluntari) grouped in 40 communes (fig. 2).

The socio-economic characteristics of the Ilfov County are strongly influenced by its position near the capital city of Romania. Not long before, this county also included Bucharest in its administrative structure. For a long period of time, the only towns in the Ilfov County were Bucharest and Oltenița. Therefore, all the administrative institutions of the county are nowadays located in Bucharest.

The traditional cultural landscape of the Ilfov County included various types of vegetation representative for the ancient forms of agroforestry[14], farmlands, grasslands for the animal husbandry, more or less wooded grasslands with natural forest element, deforested areas and areas with controlled forest exploitation[15] (P. Angelstam 2006, p. 125). Several modifications appeared during time in the landscape of Ilfov County and they can be structured in a few stages. In the first decade of the 20th century Ilfov County[16] is characterized by the existence of small and numerous settlements, surrounded by large forested surfaces and spread along the water courses[17]. An explication is given by V. Mihăilescu, who reminds of the recent alluvial deposits which formed limited gravel bars so the land for agriculture and settlement were restricted, leading to strong agglomerations (V. Mihăilescu 1925, p. 78). In the period after First World War until the 90's, there was a rising of the surface of agricultural land by deforestation and draining of some surfaces with humidity excess[18]. Also, this is a period characterized by strong industrialization. Agriculture on large surfaces almost disappeared after the 90's and until present day and the land is used for developing real estate investment projects and infrastructure works.

[14] The term is very actual today and refers to the integration of the agroforestry systems (trees) in the areas of arable soils with the aim to improve the quality of soil and to reduce the erosion of biodiversity.

[15] Reference to the areas where the old trees were felled but the roots were retained and the obtained shoots were controlled for the development of the young forests.

[16] A Europe-wide analysis (P. Angelstam 2006).

[17] This image is very well captured in the Third Topographic survey of the Habsburg Empire (V. Crăciunescu 2006).

[18] This was the aim of the field research undertaken in the northern part of the County by Vasilica Sandu between the years 1986-1987 (V. Sandu 1992, p. 289).

In the actual context, a very strict record of what can be recovered from the already known archaeological sites and from those recorded during various occasions[19], for the purpose of their protection / conservation, needs new strategies based on modern methods (GIS, photogrammetry etc.) and interdisciplinary approaches (C. Borș 2014, p. 142-147). The present paper, together with the evaluation of the anthropic impact on archaeological sites in Ilfov County, presents a methodology frequently used in other fields, which take in consideration the analysis of certain areas from the point of view of ecology, environment, urban landscape etc. and which can help the local and central authorities in order to diminish the loss in the field of immobile cultural heritage represented here by the archaeological sites (C.E. Ștefan, M.Ș. Florea 2010; L. Măruia *et alii* 2011; R.C. Stoiculescu *et alii* 2014).

◈ Methodology

The following sets of sources were used in this paper: data regarding the archaeological sites from Ilfov County, geospatial data regarding the administrative structure, the hydrographic network and relief, statistical data and maps (historical and modern).

A data base was created in the first part of this study, where the archaeological sites from Ilfov County were uploaded. All the data was extracted from LMI, RAN and the archive of DJC Ilfov.

The integration in GIS of the archaeological sites needed the official administrative-territorial data (UAT[20]) of Ilfov County. They were extracted from the data base published by ANCPI[21]. Because the RAN and LMI database does not include the limits of archaeological sites, their spatial representation was interpreted using the descriptive texts presented in the field named *adresă* (address) and defined in GIS as a point type vector. The information from the DJC Ilfov archive allowed the localization of surfaces on which archaeological excavations were carried on, but they do not give more information regarding the limits of the archaeological sites. The situation is the same for the other sources[22], which did not provide a much clear situation regarding the sites limits.

The information about the land use in Ilfov County was extracted from CORINE Land Cover[23] (A-I. Petrișor 2011). CORINE represents the European reference data set for land use (coordinating the information about environment), a project which generated vector type files grouped in 44 classes and presented as a cartographic product at a 1:100 000 scale. For the present analysis the archaeological sites from Ilfov County were linked with CORINE data in order to follow the tendency of environment changes in the nearby of archaeological sites.

The demographic evolution was taken from the statistical data of the census from the years 1912, 1948, 1992 and 2011, provided by The National Institute for Statistics.

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[19] For example, the historical studies performed to achieve the PUGs (V. Sandu 2013, p. 66-67).

[20] Administrative territorial units.

[21] Data, available at web http://geoportal.ancpi.ro, were obtained at request in 30.04.2014.

[22] I referred in particular at the PUGs to which I had access; mostly they do not offer geographical coordinates and use, as the limits of the archaeological sites, underlining or drawings based on the descriptions founded in the published historical studies.

[23] When offered as an archive, these data are named CLC, CORINE Land Cover.

The maps used in this paper are as following: *Charta României Meridionale*, *Planurile Directoare de Tragere*, the maps of the Third Topographic survey of the Habsburg Empire, the *Topographic Map of Romania* (1:25000 scale and ortophotoplans (2010 edition) obtained from Directorate for Military Topography (DTM).

◈ Results and discussions

From the LMI database were extracted 568 records belonging to the archaeological sites from Ilfov County. Corroborated with the sites files from RAN database available until December 2015, they were grouped in a number of 206 points distributed on the territory of 39 communes[24]. The spatial distribution of the archaeological sites had as starting point the analysis carried out in the project entitled „Archaeological landscape. Outlook, History, Evolution", funded by the National Cultural Fund Administration (AFCN) in the 2014 session of the cultural projects, with related updates in 2015[25] (fig. 3).

The analysis of the 206 sites from RAN and LMI databases, which represents the official record of the county, indicates differences from the real situation. This difference resulted from the comparative analysis with the data from:

(1) Field walking in Northern side of the county made by V. Sandu in 1987-1988 (V. Sandu 1992); its results, even though they were published, weren't totally integrated in LMI and RAN (fig. 4);

(2) The results of archaeological excavations made on the basis of the authorizations for construction from the DJC Ilfov archive. For the year 2008 there are 42 reports on rescue archaeological excavations and surveillance. In 80% of the mentioned cases the results of the archaeological excavations confirm the descriptions from the site file found in RAN and LMI databases (but not the exact location and area). The rest of 20% do not confirm the site file, partially (correct location but no archaeological traces were found / location is wrong but there are archaeological traces, indicating the existence of another site) or entirely (the location was wrong and there are no archaeological traces). The location referred to in this document type is the official one, offered by RAN and LMI. In each authorization issued by the related authorities, both RAN and LMI codes are mentioned.

(3) Historical studies made for the renewal of each commune PUG present differences regarding the recorded sites and the sites registered in RAN and LMI.

(4) In the case of the archaeological sites of necropolis type, which are hardly traced during field researches, it is even more difficult to estimate their limits. In this regard the excavations from Crețuleasca[26] can be mentioned, where an archaeological site was known (RAN 105437.01, LMI IF-I-s-B-20254) but after field walking and sondages the necropolis was still not found. The rescue excavations in the area of the future A3 highway (Bucureşti – Braşov, Bucureşti – Moara Vlăsiei segment) revealed, among other archaeological complexes, an inhumation necropolis with 271 graves. Archaeological researches were made only on the

[24] By data plotting no archaeological site was allocated on the Nuci commune area.

[25] http://peisaje-arheologice.ro/index.php/concept/studii-de-caz/harta-siturilor-arheologice-din-judetul-ilfov.

[26] Campaign 2010 - http://cronica.cimec.ro/detaliu.asp?k=4632&d=Cretuleasca-Stefanestii-de-Jos-Ilfov-2010 and campaign 2011 http://cronica.cimec.ro/detaliu.asp?k=4880&d=Cretuleasca-Stefanestii-de-Jos-Ilfov-malul-drept-al-vaii-Pasarea-km-7+900--8+250-2011.

perimeter marked by the highway project, the rest of the area being investigated only by surface researches.

The analysis of LMI and RAN databases correlated with DJC Ilfov archive shows the impossibility to determine the area of archaeological sites because most of them are described as a point in space. There are only few information regarding the sites dimensions, more precisely their area. Accordingly, the analysis of human impact on archaeological sites can be made only when the surfaces are large enough[27]. The analysis on small size surfaces, like the archaeological investigations made as a consequence of the construction of an individual dwelling, can hardly reveal how much of an archaeological site was affected and which is its position within the site. These elements can be very useful for developing the strategies of collaboration between local/ central authorities and investors, when the existence of a site is known in an area which is about to be developed.

Regarding the analysis based on CORINE data, the representation for Ilfov County revealed the great degree of fragmentation of the land use. Forests, with large surfaces, were good interpreted by CORINE analysis. As for areas with constructions, it looks like there are only two main surfaces, but actually there are many, not so well individualized as they are aleatory and fragmentary distributed. These observations indicate that, for Ilfov County, the CORINE files can be used only in the analysis of surfaces with forests. The surface interpreted by CORINE as being covered by forests is of 26000 Ha, value which is very close to the one offered by DTM topographical map, second edition, 1980. Using the analysis of some historical maps, by comparative methods, we could extract the surface and distribution of forests for this county in the studied period. The surface of forests determined by the *Charta 1864* is 55965 Ha and their spatial distribution within the county does not indicate major differences compared with nowadays situation. The differences appear only at ground level (fig. 5). By correlating these data with the archaeological sites distribution it can be noticed that many of the sites from Northern Ilfov County were naturally protected for a long period. Once the land use changed (pastures, agricultural lands, residential complexes), this protection diminished and even vanished in some places.

Another type of analysis realized with geospatial instruments had as base the satellite images, aerial images and the orthophotoplans. It was applied for a series of sites which were selected from DJC Ilfov archive, sites which were affected by rescue archaeological researches imposed by projects of land development (real estate projects, infrastructure projects).

From the sites affected by archaeological excavations in order to develop great residential projects, we present here the *archaeological site*[28] *from Balotești* (com. Balotești) and *archaeological site from Buftea*[29] (Buftea town).

In the case of *Balotești Site* (O. Țentea *et alii* 2010) the archaeological investigation was made in the site having as code RAN 100978.02 and LMI IF-I-s-B-15142 but the residential project was not finalized. The surface investigated by archaeological excavations was cca. 3 Ha from the 20 Ha which is the estimated entire surface of the site. Even though it covered a consistent surface of the site, the archaeological research did not managed to offer some relevant conclusions regarding the dimensions of that settlement (O. Țentea *et alii* 2010, p. 184-185). Only a few individual residences were constructed after the excavation were done

[27] This occurs whenever works at real estate projects or infrastructure plans (highways) are started.

[28] This is the name of the archaeological site in LMI 2010.

[29] This is the name of the archaeological site in LMI 2010.

in 2008 (fig. 6) as revealed by the satellite images investigated through Google Earth. In this case, the issue of site preservation is no longer a question, but that of the valorization of the archaeological materials found during filed work and excavations.

As for the site in Balotești, in the case of *Buftea archaeological site* (Buftea town) - "La Cârna" archaeological researches were also carried on in 2007. The research affected 5 Ha of the estimated cca. 30 Ha surface of the site, because a residential complex was developing in the area. According with the material discovered in the 16 archaeological complexes, the file of the site from "La Cârna"[30] was confirmed. The site limits and amplitude of inhabited area in that zone remained unknown. The archaeological report in 2012 mentions the existence of Bronze Age materials, which can be added to the site file[31].

Other major projects of land development (road infrastructure, industrial development) that affected Ilfov County on its entire surface are the highways București-Brașov and București-Constanța.

București-Brasov is another project that changed entirely the landscape and passed through two archaeological registered in RAN and LMI: Crețuleasca (RAN Code 105437.01, LMI code IF-I-s-B-20254) and Moara Vlăsiei (A. Frînculeasa *et alii* 2014). The effects are still felt nowadays because of the works of infrastructure (highway interchanges) between localities that are placed near sites. București-Constanța highway affected the archaeological sites from Vadul Anei, Tînganu and Cernica (E.S. Teodor 2011).

A comparison between the data of some census made in the studied period revealed that the demographic growth (V. Mihăilescu 1925, p. 89-91) is the main factor that affects the archaeological sites. The extension of urban surfaces in an area which until recently was far away from localities, will permanently create stress upon immobile cultural heritage.

◈ Conclusions

In this paper we present an approach less used in the archaeological filed in Romania, in order to evaluate the anthropic impact upon archaeological sites. We used the combined analysis of CORINE data with the spatial distribution of archaeological sites. The analyzed data, extracted from the official RAN and LMI databases, correlated with DJC Ilfov archive, highlighted that the extension of urban surfaces correlated with the demographic growth represent the most important factor of the anthropic impact on archaeological sites. This generates during time a radical change in the nearby area of constructions and a diminishing of the archaeological sites surface. Nowadays, few sites from Ilfov County can still be found outside localities.

Considering the protection and preservation of archaeological heritage, more precisely the diminishing of uncontrolled damage of archaeological sites, the methodology presented in this paper could be added to the preliminary studies made in the initial stages of the major projects of land development in Ilfov County.

[30] The results of the excavations and the investigated areas were extracted from the report obtained from the DJC Ilfov.

[31] http://cronica.cimec.ro/detaliu.asp?k=4998&d=Buftea-Ilfov-La-Carna-2012.

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◈ Bibliography

P. Angelstam 2006 — Maintaining cultural and natural biodiversity in Europe's economic centre and periphery in M. Agnoletti (ed.), *The conservation of cultural landscapes*, Cabi, Wallingford, p. 125-143.

C. Borș 2014 — *Protejarea patrimoniului arheologic din România. Despre situri și monumente arheologice din perspectiva evoluției cadrului legislativ în context european*, Ed. Mega, Cluj-Napoca.

P.V. Coteț 1976 — *Câmpia Română. Studiu de geomorfologie integrată*, Ceres, București.

V. Crăciunescu 2006 — *Hărțile austriece (1910) reproiectate în Stereo70*, geo-spatial.org, http://www.geo-spatial.org/download/harile-austriece-1910-reproiectate-in-stereo70, accesat în 2015-12-30.

M.Ș. Florea 2015 — Evoluția administrativ-teritorială a județului Ilfov. Studiu de cartografie comparată / The territorial – administrative evolution of the Ilfov County. A study of comparative cartography, *Muzeul Național*, XXVII, p. 337-358.

A. Frînculeasa *et alii* 2014 — A. Frînculeasa, N. Șerban, A. Anton, O. Negrea, Raport de cercetare arheologică preventivă pe autostrada Bucureşti-Ploieşti. Şantierul arheologic Moara Vlăsiei (jud. Ilfov), *Anuarul Muzeului de Istorie și Arheologie Prahova. Studii și Cercetări (SN)*, V(13), p. 114-153.

L. Măruia *et alii* 2011 — L. Măruia, D. Micle, A. Cîntar, A. Stavilă, L. Bolcu, O. Borlea, M. Ardelean, *Baza de date a siturilor arheologice cuprinse în Lista Monumentelor Istorice a judeţului Timiş. Rezultatele cercetărilor de teren*, BioFlux, Cluj-Napoca.

V. Mihăilescu 1925 — Vlăsia și Mostiștea. Evoluția geografică a două regiuni din Câmpia Română, *Buletinul societății regale române de geografie*, 43, p. 1-200.

A.-I. Petrișor 2011 — Metodologie bazată pe utilizarea datelor CORINE pentru analiza stării de calitate a patrimoniului natural în cadrul documentațiilor de amenajare a teritoriului și de urbanism, *Urbanism. Arhitectură. Construcţii*, 2 (1), p. 15-20.

V. Sandu 1992 — Cercetările arheologice de suprafaţă din nordul Sectorului Agricol Ilfov, *Cercetări Arheologice în Bucureşti*, 4, p. 289-233.

V. Sandu 2013 — Descoperiri arheologice în situl Vârteju "Grajdurile fostului C.A.P.", orașul Măgurele, județul Ilfov (Așezări din epoca bronzului, Hallstatt, secolele II-IV și X-XI d.Hr.), *Cercetări Arheologice în Bucureşti*, 9, p. 66-131.

C.E. Ștefan, M.Ș. Florea 2010 — La dynamique de l'habitat néo – enéolithique dans la microrégion Argeş – Dâmboviţa, *Pontica*, 43, p. 179-189.

R.C. Stoiculescu *et alii* 2014 — R.C. Stoiculescu, A.E. Huzui, A. Gavrilidis, A. Niță, I.G. Pătru-Stupariu, I. Călin, A. Cuciulan, What is the spatial link between the Roman civilisation and cultural landscape in Romania?, *Journal of Maps*, p. 297-307.

E.S. Teodor 2011 — Așezări din Evul Mediu timpuriu la Vadu Anei-Brănești, *CA*, XI, p. 125-170.

O. Țentea *et alii* 2010 — O. Țentea, S. Cleșiu, M.Ș. Florea, C. Borș, A. Rațiu, Cercetări arheologice preventive în zona Balotești (jud. Ilfov), *CA*, XVII, p. 177-224.

I. Ujvári 1972 — *Geografia apelor României*, Ed. Științifică, București.

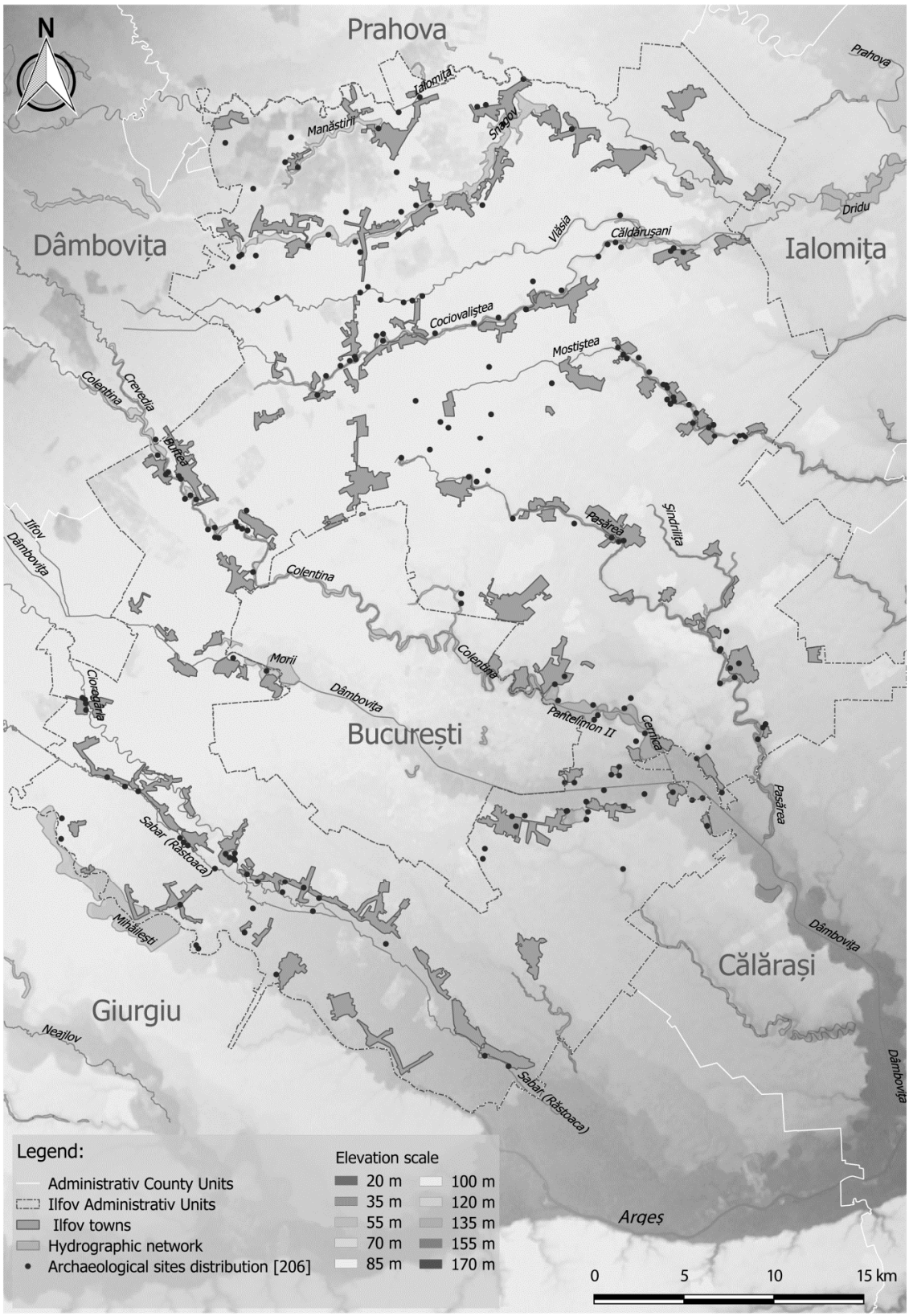

Fig. 1. Ilfov County. Geomorphological map and the distribution of the archaeological sites registered in RAN and LMI. Altitudes scales complies ASTER GDEM v.2.
Județul Ilfov. Harta geomorfologică și distribuția siturilor arheologice înregistrate în RAN și LMI. Scara altitudinilor obținută după ASTER GDEM v.2.

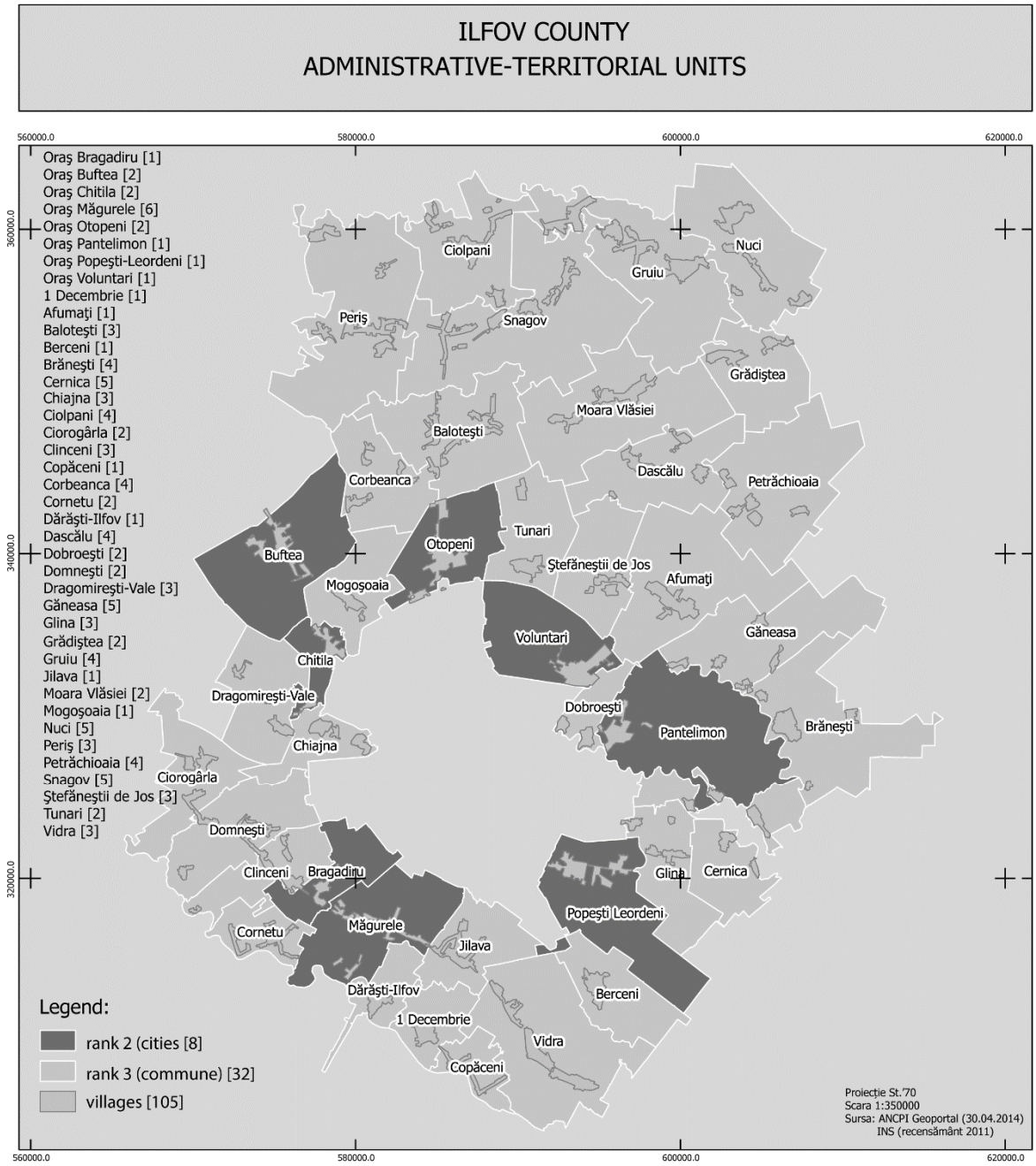

Fig. 2. UAT Ilfov County after 1996 (according ANCPI 2014, INS 2011).
Unitățile administrativ-teritoriale ale județului Ilfov după anul 1996 (sursa INS 2011, ANCPI 2014).

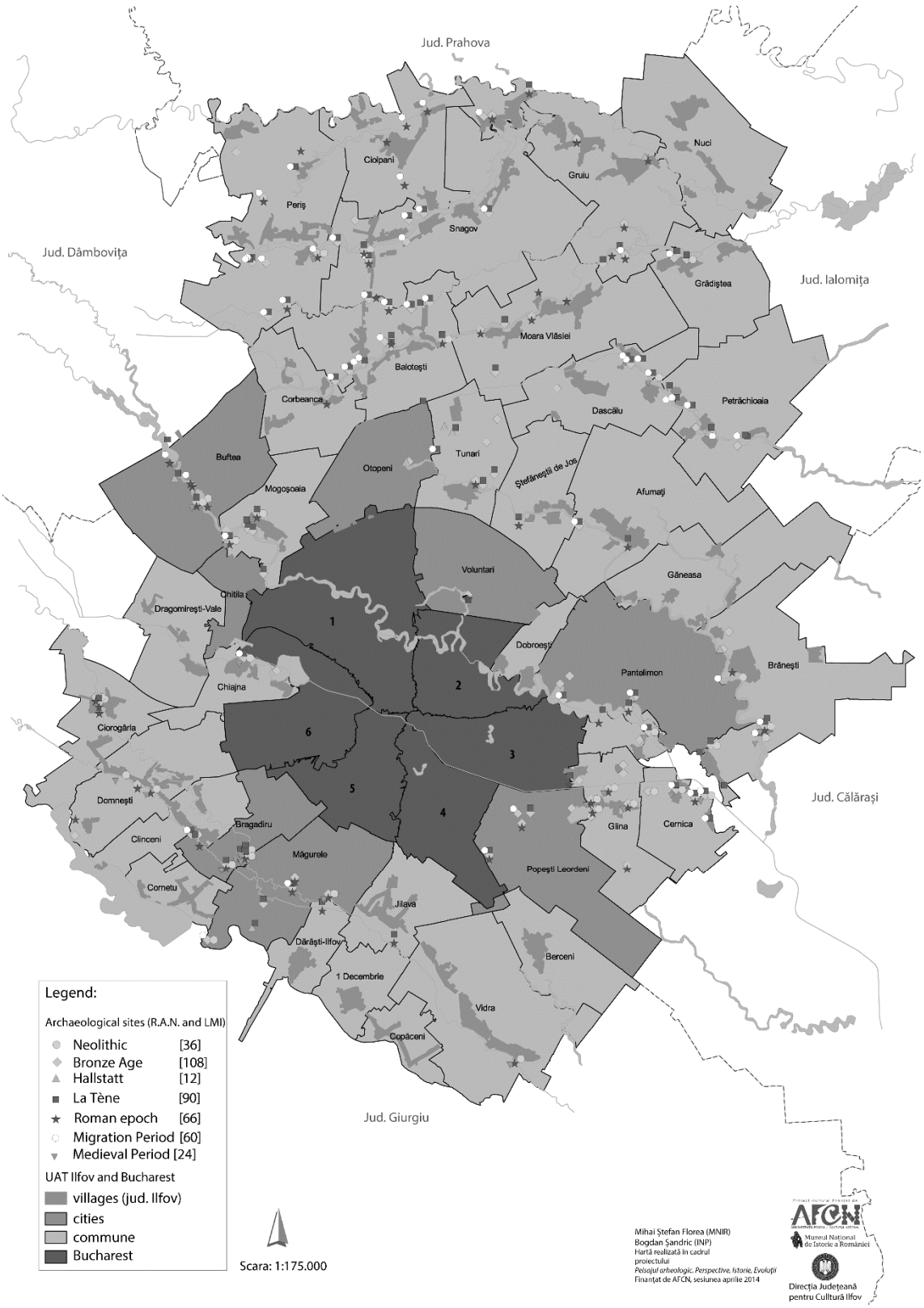

Fig. 3. The distribution of the archaeological sites from the Ilfov County according to the data from RAN and LMI.
Distribuția siturilor arheologice din județul Ilfov conform datelor RAN și LMI.

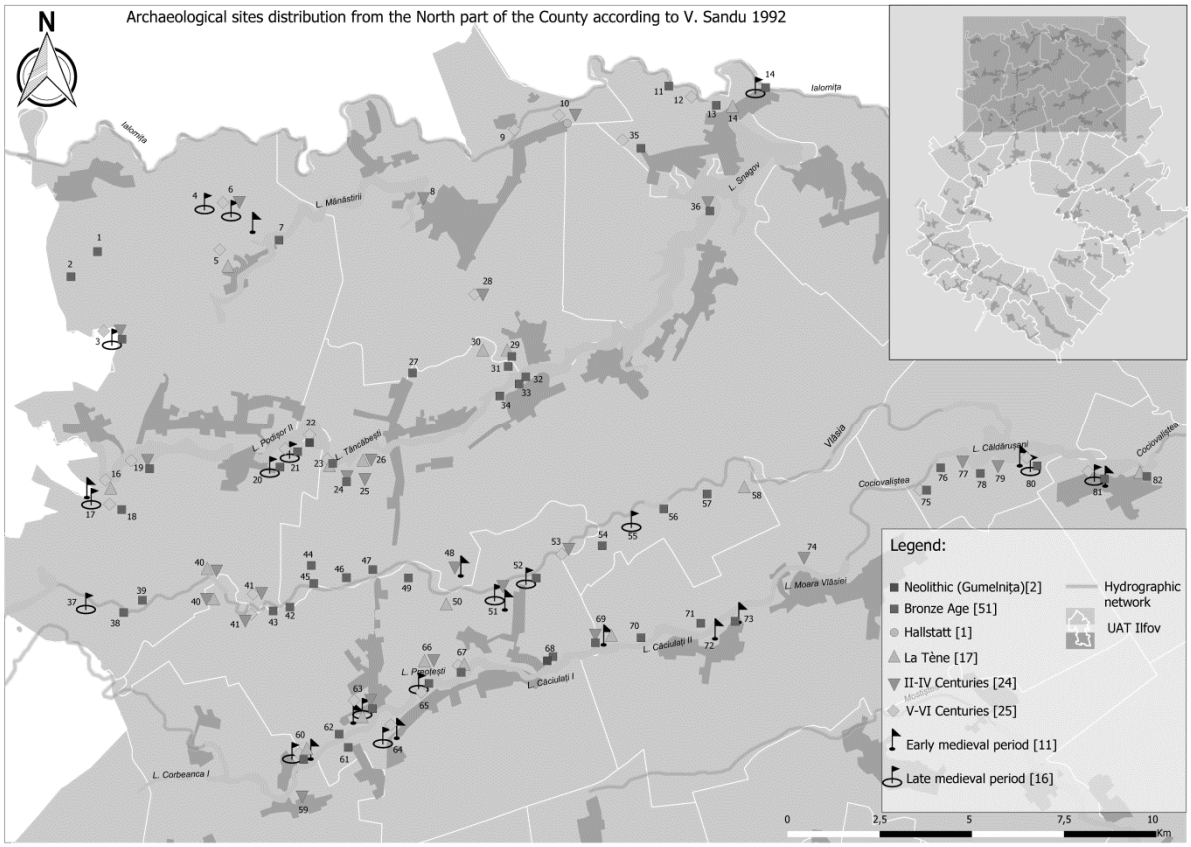

Fig. 4. The distribution of the archaeological sites from the North part of the Ilfov County according to V. Sandu 1992.
Distribuția siturilor arheologice din partea de nord a județului Ilfov, după V. Sandu 1992.

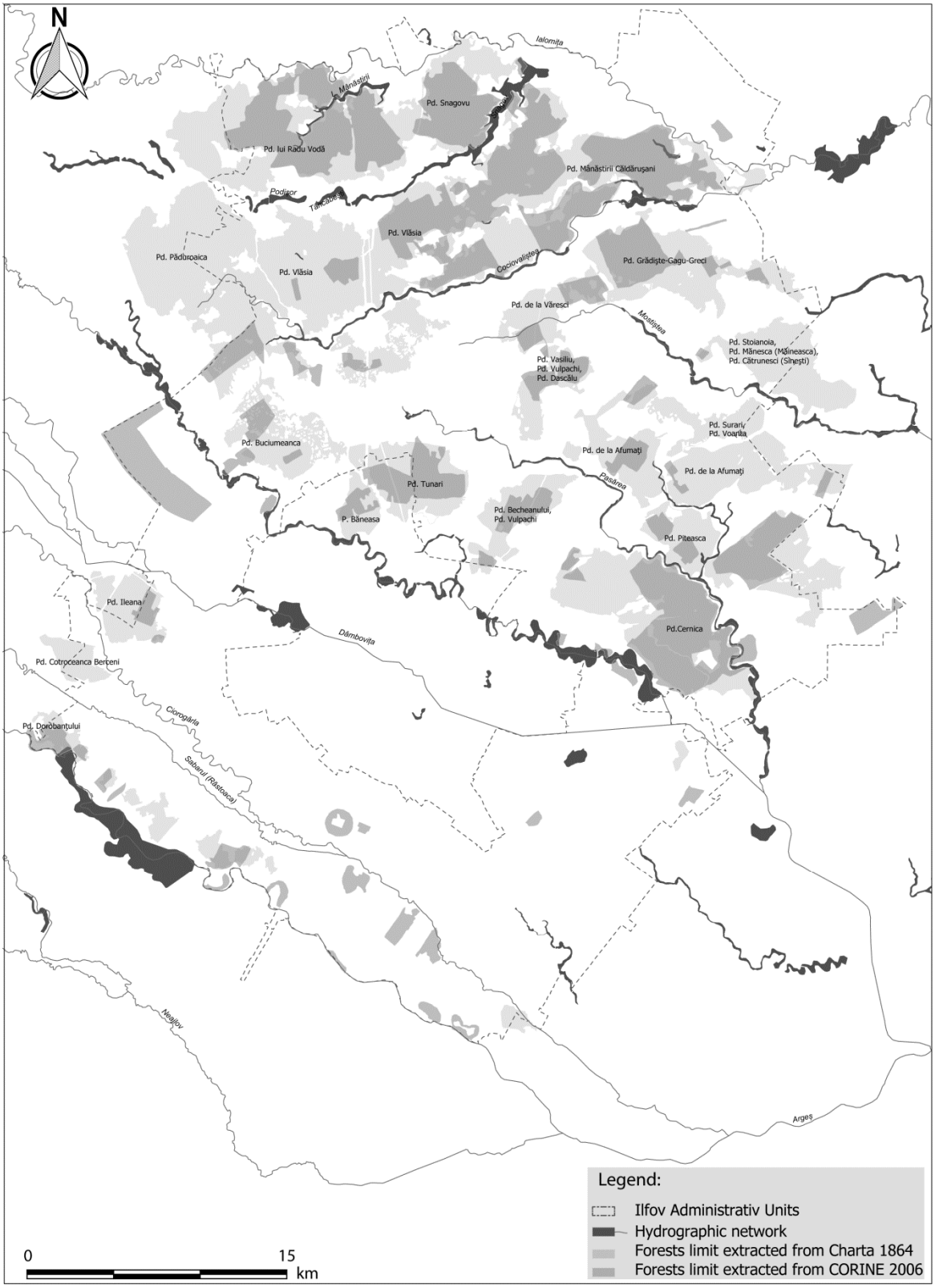

Fig. 5. The limit of the major areas of forests extracted from Charta 1864 overlaid on the CORINE data 2006, filtered by the layer "forests".
Limita suprafețelor majore de pădure extrase din Charta 1864 suprapuse pe datele CORINE 2006 filtrate pe stratul „păduri”.

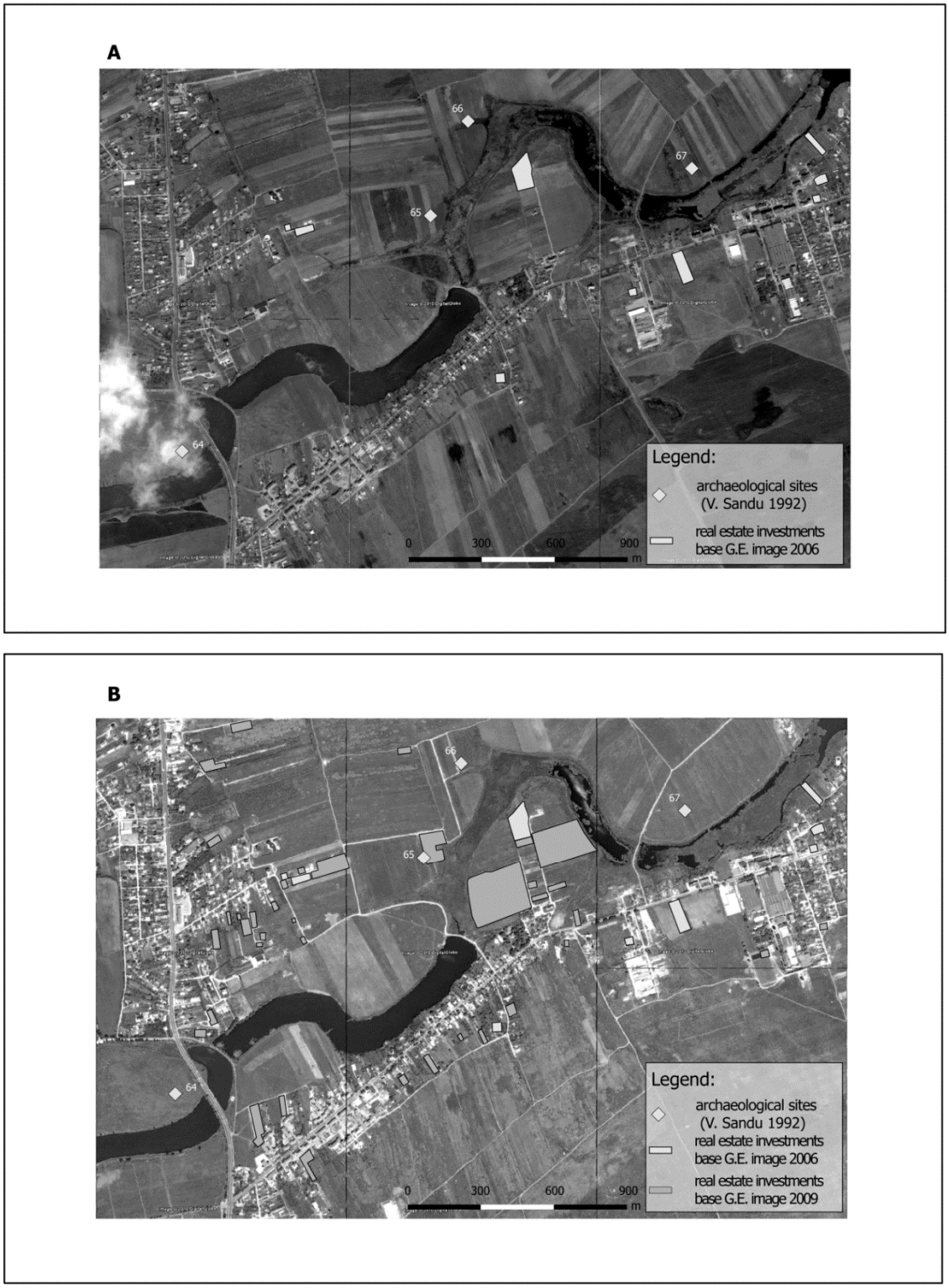

Fig. 6. Balotești area studied with Google Earth image history service. 6. A. Real estate investments that appears in the image from 2006. 6. B. Real estate investments that appears in the image from 2009 overlaid on the 2006 ones (O. Țentea *et alii* 2010, pl. 5).
Zona Balotești analizată prin serviciul de imagini istorice Google Earth. 6. A. Investiții imobiliare care apar în imaginea din 2006; 6. B. Investiții imobiliare care apar în imaginea din 2009 suprapuse peste cele din 2006 (O. Țentea *et alii* 2010, pl. 5).

PREZENTARE DE CARTE

Tiziana Matarazzo, *Micromorphological analysis of activity areas sealed by Vesuvius' Avellino eruption. The Early Bronze Age village of Afrangola in southern Italy*, Archaeopress Archaeology, Oxuniprint, Oxford, 2015, 200 p., 72 figuri color, anexă cu 91 figuri color, ISBN 978-1-78491-211-6.

Constantin HAITĂ*

Volumul de față, deși reprezintă publicarea unei lucrări de doctorat, se prezintă ca o excepție, din cel puțin două puncte de vedere. În primul rând, deoarece este realizată într-un domeniu de cercetare conex arheologiei, *Micromorfologia Solului*, care beneficiază de o metodologie de analiză foarte detaliată și directă (a unor probe de sedimente și soluri în stare nederanjată), dar care necesită de cele mai multe ori resurse financiare și umane importante. Din această cauză, dar și a faptului că această temă de cercetare nu este întotdeauna integrată în proiectele arheologice importante, astfel de contribuții științifice văd foarte rar lumina tiparului, cel puțin în țara noastră. În al doilea rând, acest studiu este dedicat unui sit preistoric datat în perioada de început a epocii bronzului, din sudul Italiei, în regiunea Campania, care prezintă condiții de conservare cu totul extraordinare, aproape unice în Europa. Erupția Avellino, a vulcanului Vesuvius, din anul 1995+10 cal BC a făcut ca vestigiile arheologice să fie acoperite cu un depozit de cenușă de aproape 1 m grosime, situl Afrangola fiind din această cauză denumit și „Noul Pompei". Această erupție vulcanică a acoperit siturile arheologice din zonă și a fosilizat întregul peisaj, inclusiv terenuri cultivate, limite de teritorii și drumuri de acces, fiind observate chiar urme de pași și urme ale unor mijloace de transport. Facem aici mențiunea că astfel de condiții de conservare, cu totul excepționale, sunt întâlnite și în cazul așezărilor de tip *tell*, cum sunt cele gumelnițene din Muntenia și Dobrogea, mai ales în situațiile în care partea superioară a secvenței stratigrafice este suprapusă de depuneri arheologice atribuite unor locuiri posterioare.

Volumul prezentat aici este structurat în 5 capitole – 1. Introducere; 2. Așezarea din epoca bronzului timpuriu Afrangola; 3. Metode; 4. Rezultate micromorfologice; 5. Discuții – și este completat cu o anexă, ce conține 91 de figuri color, în care sunt prezentate principalele caracteristici ale secțiunilor subțiri realizate pe probele micromorfologice prelevate în structuri/construcții, complexe și zone deschise.

În capitolul introductiv (1), sunt prezentate principalele elemente ale *faciesului cultural* din câmpia Campania, datat aproximativ între 4000 și 3100 cal BP, o cultură arheologică ce este caracterizată îndeosebi prin stilul și decorul ceramic. Locuirea de la începutul epocii bronzului, din această zonă, este marcată prin mici așezări sedentare, răspândite. Cele mai multe structuri de tip domestic sunt în formă de potcoavă, cu pereți din elemente de lemn împletite și stuf, susținuți de pari de diferite dimensiuni (în general cca. 25 cm diametru), amplasați în lungul

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laturilor structurii. Podelele nu erau realizate din materiale preparate – *construite*, iar partea internă a pereților era lutuită doar în rare cazuri. Aceste structuri au dimensiuni de 4-15 m lungime și 3-9 m lățime. Construcții de mai mici dimensiuni sunt situate în jurul așezărilor; structurile nu sunt fortificate, dar apar grupate. Gropile de par observate uneori sunt atribuite unor limite / *garduri*, ce separă zone din interiorul așezărilor. În regiunea Campania, în perioada de început a epocii bronzului, este cunoscută o locuire caracterizată printr-o economie mobil-sedentară, constând din așezări permanente ce depind de o economie cerealieră, practicată în zonele joase, combinată cu gestiunea caprinelor prin transhumanță (sezonieră) în zonele montane.

În capitolul referitor la prezentarea contextului arheologic (2), sunt prezentate cadrul fizico-geografic, principalele formațiuni geologice, incluzând principalele secvențe de roci eruptive, ca și caracteristicile solurilor formate pe depozite vulcanice.

Așezarea Afrangola a fost descoperită în anul 2005, în timpul construcției unei căi ferate de mare viteză, și a fost cercetată de o echipă pluridisciplinară în perioada iulie 2005 - octombrie 2006. Elementele de arhitectură identificate corespund unor locuințe de mari dimensiuni, în formă de potcoavă, dar și rectangulare, unor locuințe de mai mici dimensiuni, ovale și circulare, unei serii de complexe de tipul unor zone de activitate, o zonă închisă, delimitată prin garduri, acestea fiind indicate prin gropile de par succesive. Artefactele sunt reprezentate în principal prin cele 400 de vase ceramice, majoritatea intacte, unele având o înălțime de aproape 1 m, fiind adecvate atât stocajului, cât și preparării hranei solide sau lichidelor. Așezarea prezintă caracteristici tipice pentru perioada de început a epocii bronzului din regiunea Campania, areal pentru care, pe baza cercetărilor arheologice, a fost definită o strategie de practicare a agriculturii cunoscută sub numele *a campi ad erba*, constând în faptul că utilizarea terenurilor agricole alterna între cultivarea plantelor și pășunat. De asemenea, râul Clanis, din apropierea așezării cercetate, ar fi putut să aibă un rol important în economia agricolă a acesteia, fiind utilizat pentru irigarea naturală, în timpul inundațiilor, a teritoriilor învecinate, unde sunt situate o mare parte a terenurilor cultivate identificate până în prezent. Cercetările arheologice indică faptul că Afrangola era una dintre cele câteva așezări active în timpul erupției Avellino. Lipsa obiectelor de metal este interpretată atât prin depunerea lor, în epocă, în depozite caracteristice de tip „ripostigli", dar și prin faptul că locuitorii ar fi putut recupera bunurile înainte de a se salva din fața erupției vulcanice. De asemenea, lipsa resturilor scheletice umane și prezența a numai două schelete de animale (o pisică și un câine) indică faptul că situl a fost părăsit înainte de a fi acoperit cu cenușă vulcanică.

În capitolul metodologic (3), sunt prezentate definiția micromorfologiei solului, contextul de teren și localizarea celor 80 de eșantioane, procesarea probelor pentru realizarea secțiunilor subțiri și conceptele și terminologia analizei la microscop. Principalele elemente descriptive considerate sunt: microstructura și porozitatea, matricea sedimentară, ce include materialele grosiere – de origine organică și anorganică, masa fină și caracteristicile pedologice texturale (de ex., peliculele argiloase) și chimice (de ex., impregnațiile calcitice), sin-depoziționale, dar și post-depoziționale.

Capitolul dedicat rezultatelor analizei micromorfologice (4) este cel mai amplu dar și foarte bine ilustrat, atât în ceea ce privește contextul de teren, dar și prin imagini ale secțiunilor subțiri analizate și prin fotografii realizate la microscopul optic cu lumină polarizată. Menționăm aici calitatea ireproșabilă a lucrării, atât ca sinteză și structură a informației analizate și prezentate, dar și prin calitatea ilustrației și suportul tipăriturii.

În vederea caracterizării cadrului natural și a înțelegerii proceselor fizico-chimice și pedologice, au fost prelevate eșantioane martor din orizontul de paleosol și, respectiv, din

sedimentele depuse în timpul erupției. În prima parte a acestui capitol, sunt descrise principalele tipuri de microstructură și constituenții principali ai probelor studiate, urmând ca în continuare să fie prezentate situațiile arheologice cercetate, fiecare locuință, structură sau complex, în parte, fiind ilustrat printr-un plan și prin câteva imagini sugestive din timpul cercetărilor.

În capitolul final (5), dedicat discuțiilor, sunt organizate tematic cele mai importante rezultate ale studiului micromorfologic în context domestic – în interiorul construcțiilor și în complexe și zone de activitate exterioare (zone deschise, zone protejate cu garduri, zone de deșeuri). În ceea ce privește locuirea din interiorul structurilor, sunt de remarcat raritatea constituenților antropici, ce sugerează un spațiu neobișnuit de curat. [Protejarea solului de locuire prin cuverturi vegetale nu poate fi luată în considerație, întrucât acestea, dacă ar fi existat, cu siguranță ar fi fost observate în aceste condiții deosebite de conservare.] Faptul remarcat este deci interpretat ca un indiciu al unei locuiri de scurtă durată. Compactarea diferențiată a solului din interiorul locuințelor, prin pasaj repetat, este interpretată în termeni ai activităților umane. Zonele de circulație sunt diferențiate de zonele de stocaj, în unele cazuri acestea din urmă fiind atestate prin informațiile arheologice, ca și zonele ce păstrează urme ale unor elemente de lemn și sugerează prezența unor piese de mobilier. Nu au fost descoperite indicii asupra cuverturilor vegetale, lutuieli sau alte materiale destinate protecției suprafeței locuite, deși impresiunile de împletituri vegetale, abundența materialelor vegetale arse și a fitolitelor indică faptul că aceste materiale erau disponibile. De asemenea, nu există indicii ale unor soluri construite, suprafața locuită fiind realizată din materialul din care este constituit solul natural local. Se poate considera că timpul investit în prepararea podelei era redus, la fel ca și în cazul construcției locuinței. Asocierea resturilor de combustie cu râșnițe, suprafețe preparate – de tip *concotto*, oase și lentile micro-stratificate cu cenușă carbonatică, sugerează activități de preparare a hranei, acestea fiind localizate în general în vecinătatea cuptoarelor. Alte structuri sunt atribuite unor funcții diferite, de la stocaj (atât a grânelor, dar și a instrumentarului necesar pentru lucrarea ogorului, inclusiv a unui car) la hrănirea sau nașterea (!) animalelor. În cazul depunerilor stratificate, ce includ constituenți antropici frecvenți, cel mai adesea identificate în zone de deșeuri, se estimează o intensitate scăzută a locuirii, exprimată atât prin gradul de compactare a solului, cât și prin intensitatea acumulării antropice.

Atribuirea funcționalității spațiului locuit contribuie, alături de informațiile de ordin arheologic privind arhitectura și caracterizarea artefactelor, la formularea interpretărilor arheologice privind structura ierarhică a comunității, pe baza diferențierii sociale. În concluzie, analiza micromorfologică reliefează faptul că, în ciuda eforturilor necesare realizări unor tipuri variate de structuri, ce servesc unor scopuri diverse, așezarea cercetată nu a beneficiat de o locuire intensă. Fortuit, locuirea a fost de scurtă durată, cca. cinci ani, sau poate chiar mai puțin de doi ani (!), înainte de a fi distrusă de erupția Avellino a vulcanului Vezuviu.

Așa cum era de așteptat, lucrarea prezentată a beneficiat de sprijinul unor cercetători reputați în domeniu, dar și de o bibliografie tematică foarte cuprinzătoare.

Deși prezentarea noastră succintă nu a evidențiat decât o mică parte a informațiilor prezentate în acest inedit volum, sperăm că acesta va suscita, cât mai pe larg, interesul arheologilor din țara noastră; cazurile studiate sunt cu atât mai interesante, cu cât o mare parte a temelor discutate nu este foarte des întâlnită în literatura arheologică de la noi.

ABREVIERI

ACMIT	Anuarul Comisiunii Monumentelor Istorice, Secţia pentru Transilvania, Cluj-Napoca
AD	Archaeological Dialogues, Cambridge
AIGR	Anuarul Institutului Geologic al României, Bucureşti
AJA	American Journal of Archaeology, Boston
AJPA	American Journal of Physical Anthropology, New York
Aluta	Aluta, Sfântul Gheorghe
AMIAP	Anuarul Muzeului de Istorie şi Arheologie Prahova, Ploieşti
AMM	Acta Musei Meridionalis, Vaslui
AMN	Acta Musei Napocensis, Cluj-Napoca
AMP	Acta Musei Porolissensis, Zalău
AMT	Acta Musei Tutovensis , Muzeul "Vasile Pârvan" Bârlad
AnB	Analele Banatului S.N., Timişoara
AO (SN)	Arhivele Olteniei (Serie Nouă), Craiova
ARCIFE	Academia RSR, Centrul de Istorie Filologie şi Etnografie, Seria Antropologică, Craiova
Argessis	Argessis, Studii şi comunicări, Piteşti
Apulum	Apulum, Alba Iulia
ArchB	Archaeologia Bulgarica, Sofia
ARCS	Annals of The Royal College of Surgeons, Londra
ArhMold	Arheologia Moldovei, Iaşi-Bucureşti
ArheologijaSofia	Arheologija. Organ na Arheologičeskija Institut i Muzej, Sofia
ARMSI	Academia Română. Memoriile Secţiunii Istorice, Seria III, Bucureşti
AS (IMP)	Archaeological Series (International Monographs in Prehistory)
B(M)SAP	Bulletin et Mémoires de la Societé d'Anthropologie de Paris, Paris
BA	Biblical Archaeologist, Atlanta
BAI	Bibliotheca Archaeologica Iassiensis, Iaşi
BAR	British Archaeological Reports, Oxford
BAR (BS)	British Archaeological Reports, British Series, Oxford
BAR (IS)	British Archaeological Reports, International Series, Oxford
BF	Before Farming, United Kingdom
BFSC	Buletinul Facultăţii de Ştiinţe, Cernăuţi
BiblThr	Bibliotheca Thracologica, Bucureşti
BMA	Bibliotheca Musei Apulensis, Alba Iulia
BMG	Bibliotheca Musei Giurgiuvensis, Giurgiu
BMN	Bibliotheca Musei Napocensis, Cluj-Napoca
BMJTA	Buletinul Muzeului Judeţean "Teohari Antonescu", Giurgiu
BMSAP	Bulletins et Mémoires de la Société d'Anthropologie de Paris, Paris
BRGK	Bericht der Römisch-Germanischen Kommission des Deutschen Archäologischen Instituts, Frankfurt am Main
BSA	Annual of the British School of Archaeology at Athens, Atena
BSPF	Bulletin de la Société Préhistorique Française, Paris

BSSC	Buletinul Societăţii Ştiinţifice din Cluj, Cluj-Napoca
CA	Cercetări Arheologice, Bucureşti
CAANT	Cercetări Arheologice în Aria Nord-Tracă, Bucureşti
CCDJ	Cultură şi Civilizaţie la Dunărea de Jos, Călăraşi
CI	Cercetări Istorice, Iaşi
CIAAP	Congrès International d'Anthropologie et d'Archéologie Préhistoriques, Bruxelles
Cronica	Cronica Cercetărilor Arheologice, Bucureşti
Dacia (NS)	Dacia (Nouvelle Serie). Revue d'Archéologie et d'Histoire Ancienne, Bucureşti
DocPraeh	Documenta Praehistorica, Ljubljana
Drobeta	Drobeta, Drobeta Turnu-Severin
EJA	Journal of European Archaeology, London
ERAUL	Etudes et Recherches Archéologiques de l'Université de Liège, Liège
Eurasia	Eurasia Antiqua, Berlin
IJO	International Journal of Osteoarchaeology, Wiley Interscience.
IJNA	International Journal of Nautical Archaeology, London
INA	Institute of Nautical Archaeology, Drawer
Izvestija	Izvestija na Arheologiskija Institut, Varna
IzvestijaVarna	Izvestija na Narodnija Muzej (Izvestija na Varnenskoto Arheologičesko Družestvo), Varna
JAA	Journal of Anthropological Archaeology
JAS	Journal of Archaeological Science
JEA	Journal of European Archaeology, London
JFS	Journal of Forensic Sciences, West Conshohocken
JMA	Journal of Mediterranean Archaeology, London
JWM	Journal of Wildlife Management, Texas
Materiale	Materiale şi Cercetări Arheologice, Bucureşti
MAU	Materiali z Antropologij Ukrajni, Kiev
MCA (SN)	Materiale şi Cercetări de Arheologie (Serie Nouă), Bucureşti
MemAnt	Memoria Antiquitatis, Piatra Neamţ
MM	Mesolithic Miscellany, Wisconsin
MNIT	Muzeul Naţional de Istorie a Transilvaniei
OJA	Oxford Journal of Archaeology, Oxford
PA	Probleme de Antropologie, Bucureşti
PA – ND	Pervobitnaja Arkheologhija – Naukova Dumka, Kiev
PBF	Prähistorische Bronzefunde
PMMB	Publicatiile muzeului municipiului Bucuresti
PNAS	Proceedings of the National Academy of Science of the USA, Washington
PRIA	Proceedings of the Royal Irish Academy, Irlanda
PTRS	Philosophical Transactions of the Royal Society of London, Londra
PZ	Prähistorische Zeitschrift, Leipzig-Berlin
RDAC	Report of the Department of Antiquities, Cyprus, Lefkosia
QI	Quaternary International

RSP	Rivista di scienze preistoriche, Firenze
SAA	Studia Antiqua et Archaeologica, Iași
SAI	Studii si articole de istorie
SCA	Studii şi Cercetări de Antropologie, Bucureşti
SCIV(A)	Studii şi Cercetări de Istorie Veche (şi Arheologie), Bucureşti
SE	Sovetskaja Etnografia, Moscova
SP	Studii de Preistorie, Bucureşti
StudPraeh	Studia Praehistorica, Sofia
Tor	Tor. Tidskrift för arkeologi – Journal of Archaeology, Uppsala
VAH	Varia Archaeologica Hungarica, Budapesta

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Mihaela GOLEA, Mala STAVRESCU-BEDIVAN, Cătălin LAZĂR - Macroresturi vegetale descoperite în situl arheologic Sultama – Malu Roşu, judeţul Călăraşi: studiu preliminar / Vegetale macrorests discovered at Sultana – *Malu Roşu* archaeological site, Călăraşi County: preliminary study

Mihai CONSTANTINESCU, Mihaela CULEA - Studiul antropologic al cimitirului neolitic de la Gârleşti, jud. Dolj / Anthropologic study of the Neolithic cemetery from Gârleşti, Dolj County

Alin FRÎNCULEASA, Bianca PREDA, Tiberiu NICA, Andrei-Dorian SOFICARU - Un nou tumul preistoric cercetat la Ariceştii Rahtivani (jud. Prahova) / A new prehistoric tumulus investigated at Ariceştii Rahtivani (Prahova County)

Alexandra ION - The making of historical bodies: sex, race, and type in the Beginnings of the Romanian physical anthropology?

***Supplementum* 1/2005**

Valentin RADU - Atlas for the identification of bony fish bones from archaeological sites, Editura Contrast, Bucureşti

***Supplementum* 2/2007**

Corneliu BELDIMAN - Industria materiilor dure animale în preistoria României. Resurse naturale, comunităţi umane şi tehnologie din paleoliticul superior până în neoliticul timpuriu / *L'industrie des matières dures animales dans la préhistoire de la Roumanie. Ressources naturelles, communautés humaines et technologie dès le Paléolithique supérieur au Néolithique ancien*, Editura Pro Universitaria, Bucureşti

***Supplementum* 3/2008**

Roxana DOBRESCU - Aurignacianul din Transilvania / *The Aurignacien from Transylvania*, Editura Renaissance, Bucureşti.

***Supplementum* 4 - în curs de apariţie**

Douglass W. BAILEY - Archaeology today: discussions of themes, goals, and methods. Editura Cetatea de Scaun, Târgovişte.