CERNAVODĂ – *COLUMBIA D* PUZZLE: THE SKULL COMPLEX

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Keywords: *Late Neolithic, Hamangia culture, burial ground, secondary manipulation of human remains*
Abstract: *This paper focuses on the re-analysis of a feature from the Late Neolithic Hamangia cemetery at Cernavodă – Columbia D (Constanţa County, Romania), excavated at the middle of the last century. The analysis took place in several stages: processing of archaeological information, anthropological re-evaluation, combination of the two sets of data, and interpretation. The sample of the re-analysed human osteological material includes 11 fragmentary crania and several dozens of other cranial and postcranial remains. Two of the crania present interesting characteristics: one was cut, broken, with a postmortem trepanation, and was polished, while the other bears the traces of a benign tumoral cyst. Another skull fragment bears traces of postmortem burning. In addition to human remains, this feature yielded a pig mandible, freshwater mussel shells, a bolder, a pottery sherd and a fragment of a stalactite/stalagmite.*

Cuvinte-cheie: *neolitic târziu, cultura Hamangia, cimitir, manipulare secundară a resturilor osteologice*
Rezumat: *Lucrarea este concentrată pe reanalizarea unui complex din cimitirul neolitic Hamangia de la Cernavodă – Columbia D (jud. Constanţa, România), cercetat arheologic la mijlocul secolului trecut. Analiza a parcurs mai multe etape: procesarea informaţiilor arheologice, reevaluarea antropologică, combinarea şi interpretarea celor două seturi de date. Eşantionul scheletic uman re-analizat este format din 11 calote craniene şi alte câteva zeci de resturi craniene şi postcraniene. Două calote prezintă caracteristici deosebite; una a fost decalotată, ruptă, trepanată postmortem şi şlefuită, iar alta prezintă urmele unui chist benign tumoral. La acestea adăugăm un fragment cranian cu urme de arsură (incinerare postmortem). Pe lângă resturi scheletice umane, complexul a conţinut şi o mandibulă de porc, scoici de apă dulce, o piatră, un fragment ceramic şi un fragment de stalagmită/stalactită.*

INTRODUCTION

The discoveries pertaining to the Hamangia cemetery from Cernavodă – *Columbia* D (Fig. 1), made in the middle of the last century, are still mostly obscure at a detailed level. Previous recent publications have presented information and analyses concerning the topography of the site and the various types of artefacts (Morintz, Kogălniceanu 2008; Kogălniceanu 2012a; Mărgărit 2012; Kogălniceanu, Haită 2015; Kogălniceanu *et alii* 2017). This paper focuses on a specific archaeological feature, namely the Skull Complex.

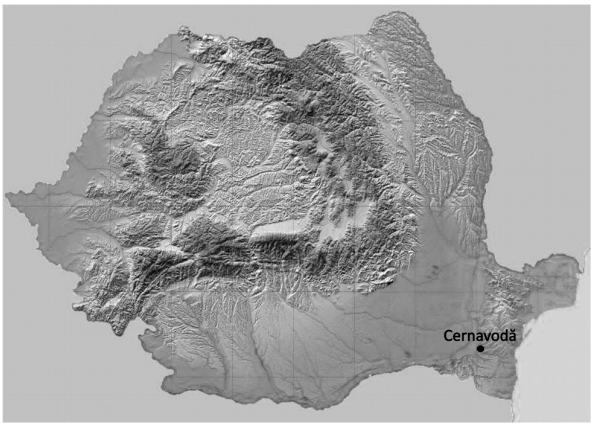

Figure 1. *Location of the Cernavodă – Columbia D site.*

MATERIAL AND METHOD

The Skull Complex was only mentioned once, in an annual excavation report, being described briefly and accompanied by mediocre quality photography (due to the printing capabilities of the time) compared to present-day possibilities[1]. At the moment of publication, the anthropological analysis, had, most probably, not been

[1] În groapa-albie din punctul *Columbia D*, Ş I, …… *„La o adâncime destul de mică s-a dat peste o grupă de şase cranii fragmentare pe două rânduri, între care se găsea o falcă de animal (porc), iar deasupra rândului de la est zăcea un femur omenesc aşezat transversal (fig. 7). La capătul de sud se afla o piatră de râu aşezată aici intenţionat. La ridicare s-a descoperit un mic fragment dintr-un maxilar superior şi fragmente mici de cochilii de scoici de apă dulce. Nu s-a descoperit nici un obiect arheologic şi nu s-a constatat nici o deranjare ulterioară sau depuneri aluvionale."* / *In the ravine from Columbia D, S I, …."At a quite shallow depth, a group of six fragmented skulls was encountered, laid in two rows with an animal (pig) jaw in-between them, and with a human femur laid transversally on top of the eastern row (fig. 7). A river stone placed intentionally was found at the southern end. When picked up, a small fragment of upper jaw and small fragments of mussel shells were found beneath it. No artefact was found and no later disturbance or alluvial deposit was noted."* (Morintz *et alii* 1955, p. 154–156, fig. 7).

performed yet. Our work on archives and storage facilities led to the identification of supplementary data, of descriptive nature and sketches (see transcription of the field notes in Annex 1), as well as photographic (see Annex 2)[2].The skulls were assigned numbers by the excavators from 1 to 6, numbers that we preserved during this reconstruction. The first stage of the study aimed at summarizing the archive information and elaborating a complete description of the analysed feature in spreadsheet form.

The skeletal remains that make up the Skull Complex were studied in the 1950s by a team of anthropologists from Iaşi led by O. Necrasov. Seven individuals from this feature (anthropological ID numbers 8, 9, 10a, 10b, 10c, 36a, 36b[3] – see Annex 3) were identified and analysed at that time (Necrasov *et alii* 1981, p. 21–23, 35). Recent advances in anthropological research (mainly in morphoscopy, biometrics, palaeopathology and demography) and improvements in methods of analysis of commingled human remains, led to our decision to reanalyse the Skull Complex.

The skeletal material from the Skull Complex is part of the "Cernavodă" osteological collection curated at the Laboratory for Animal Morphology of the Biology Faculty of "Alexandru Ioan Cuza" University of Iaşi, under the custody of Associate Professor Luminiţa Bejenaru, PhD.

The osteological sample analysed here comprises 11 fragmentary and fragmented human crania and a further 34 fragmented cranial and postcranial remains (three teeth, a mandible fragment, 13 cranial fragments and 17 postcranial fragments).

All skulls were partially reconstructed in the 1950s, except for Skull no. 5[4] (424b[5]) which was found in a fragmentary state in the storage area of the "Vasile Pârvan" Institute of Archaeology in Bucharest, among boxes with pottery fragments from the same site. This skull was reconstructed by the present authors, followed by the recording of bio-morphometric data. A right parietal fragment from ID 36a (Skull 4), analysed in 1954 by O. Necrasov, was found in the same package with the cranial remains of ID 424b (Skull 5). The parietal fragment was re-attached to the original skull. This prompted us to restart the analysis from scratch. In consequence, all osteological remains from the Skull Complex were reorganized, re-inventoried and re-analysed, mainly following the method proposed by Buikstra and Ubelaker (1994, p. 9–15) for the analysis of commingled human remains.

The first stage consisted of identifying the remains based on the archaeological and anthropological labels and the markings visible on bones[6]. This step was followed by anatomical sorting (cranial or postcranial), determination of laterality (left or right side), reconstruction of some of the skulls and individual attribution (White, Folkens 2005).

Age at death of sub-adult individuals (only for ID 10b, an infant) was estimated based on the stage of eruption of temporary dentition and its replacement by a permanent one (Schaefer *et alii* 2009). For individuals older than 20 (8a, 8b, 9, 10a, 10c, 10d, 10e, 36a, 36b and 424b), the indicators used to establish age at death were: obliteration of cranial sutures and the presence of some degenerative bone modifications, the degree of wear of the dental crowns; the degenerative modifications on the sacroiliac articular surface, the structural modification of the spongy tissue from the proximal metaphyseal area of the femur and humerus and the presence of some involutive bone modifications. Sex determination (undetermined, female, probable female, probable male, and male) was done only for the individuals older than 20, by observing the general shape of the skull, the cranial bone robusticity, the development of the bone relief, the forehead shape, the aspect of the supraorbital margins, the size of the mastoid process, the size of articulations and the development of the muscle insertions (Nemeskéri *et alii* 1960; Ubelaker 1979; Brothwell 1981; Buikstra, Ubelaker 1994; Mays 1998; Walrath *et alii* 2004, White, Folkens 2005; Schmitt 2005; Latham, Finnegan 2010).The classification by age groups for adults followed the method recommended by Buikstra and Ubelaker (1994, p. 36), defining three distinct categories: young adult (20-34 years), middle-aged adult (35-49 years), and older adult (50+ years).

The biometric, conformative and morphoscopic analyses followed the methods recommended by Broca (1875), Eickstedt (1934), Martin and Saller (1957–1966), Olivier (1969) and Buikstra and Ubelaker (1994), while the evaluation and classification of the absolute (measurements) and relative (indices) values was done

[2] Both the field notes and existing photographs are in the archive of the "Vasile Pârvan" Institute of Archaeology in Bucharest.

[3] We offer the following clarifications: 1. During the 1950s anthropological analysis, an ID number was assigned to each package with bones received from the excavators. When more than one individual was identified in the same package by the anthropologists, they were assigned different letters a, b, c, etc. 2. The anthropological IDs 8, 9 and 10 were explicitly grouped in the report on the anthropological analysis as part of the "skull pit", while ID 36 was described separately and added by us to the other remains based on the archaeological labels found together with the human remains and on the markings on the bones.

[4] Number given by the archaeologists during excavation.

[5] The manuscript (Necrasov *et alii* 1981) of the anthropological analysis ends with ID 404. During the ordering and processing of the archaeological materials excavated at Cernavodă, presently in the care of the "Vasile Pârvan" Institute of Archaeology in Bucharest, several other packages containing human bones and isolated bones recovered from pottery packages were identified and sent to Iaşi to be re-united with the rest of the human osteological collection. They received IDs in succession to those from the manuscript relating to the earlier anthropological analysis.

[6] These marking were recorded in a table (see Annex 4) and photographed, to remain in the database of this study.

according to the dimorphic scales proposed by Alexeev and Debetz (1964).

Identification of the palaeopathological processes and skeletal anomalies followed the method proposed by Mays (1998), Aufderheide and Rodriguez-Martin (1998), Ortner (2003), Mann and Hunt (2005), Roberts and Manchester (2007), Molleson (2007), Katzenberg and Saunders (2008), Brickley and Ives (2008), Waldron (2009) and Barnes (2012). Skeletal markers, seen in the specialized literature as functional adaptations or occupational / life style indicators (mechanical enthesopathies, musculoskeletal stress markers) were also noted.

The cranial fragment with traces of burning (marked C.V.8 and reassigned as ID 8b) suffered taphonomic modifications, being almost completely covered with a consistent coating of chalk, strongly adhering to the external and internal bone surfaces. The fact that a trace of brown-blackish bone substance could be noted in the bone section, determined us to remove part of the chalk layer, even at the risk of breaking the bone during cleaning, which indeed happened. The method chosen to remove the chalk layer was ultrasound scaling, a procedure that implied, besides the ultrasonic power action, also the use of a water jet. As a consequence, after cleaning part of the fragment, and because of some previously undetected fissures, the bone fractured, which led us to give up cleaning it completely. Subsequent analysis of this fragment suggested the following stages. The degree of cremation was recorded (according to the colour of the bone wall and of the *diploë*), as well as the texture and the cracking pattern of the bone wall. We also looked for indicators of the state of the bone at the time of cremation (green or dry), such as: "white plating", warping, deformation under the action of a thermic factor, and the cracking pattern according to the methodology proposed by Guillon (1987), Ubelaker (1979), McKinley and Roberts (1993), Buikstra and Ubelaker (1994, p. 96–97), Bondioli *et alii* (1994), Mays (1998), Whyte (2001), McKinley (2004), Gatto (2007), Fairgrieve (2008), Walker *et alii* (2008), Ubelaker (2009), and Symes *et alii* (2012). The biological age of the individual represented by this bone fragment was estimated according to the degree of obliteration of the S4 sagittal sutural segment (*pars obelica*), and the sex according to the thickness of the parietal bone wall, according to the method elaborated by Gejvall and recommended by Wahl (1996). The cremation degree and burning temperature were estimated morphoscopically, using the RGB (Red-Green-Blue) colour scale (Walker *et alii* 2008). The presence or absence of antemortem produced trauma was evaluated according to the methodology proposed by Pope and Smith (2004).

As the human bones from the Skull Complex suffered secondary postmortem manipulations, being discovered in a commingled state, but also because the osteological inventory was incomplete, palaeodemographic analysis imposed the estimation of the minimum number of individuals (MNI) – the smallest number of estimated subjects possible to have contributed to the formation of the skeletal assemblage. Other than the "most frequent bone on the right or left side" indicator (in this case, the left parietal bone, and more precisely, the posterior sagittal *foramen parietale* area), for estimating MNI we also used age indicators (sub-adult or adult), and also the particular morphoscopic characteristics, according to the method proposed by Buikstra and Ubelaker (1994, p. 9), Mays (1998, p. 26–32), Ubelaker (2002), Adams and Konisberg (2004; 2008), Bello (2005), Byrd and Adams (2011), and Lambacher *et alii* (2016).

Finally, the taphonomic history of these skeletal remains was analysed. After recording the conservation status (good, moderate or precarious) of the skeletal material (Connell 2008, p. 9) and the degree of representation (almost complete, partially represented or weakly represented) (Buikstra and Ubelaker 1994, p. 5–8), we observed the degree of articulation (articulation, semi-articulation, disarticulation), the characteristics of the break lines and the types of modifications on the bone surface produced during their time in the soil (weathering, discoloration, polish, cutmarks, evidence of rodent and carnivore gnawing, other forms of bio-cultural modifications). The taphonomic indicators were recorded according to the methodology recommended by Morlan (1984), Duday *et alii* (1990), Larsen (1997), Buikstra and Ubelaker (1994, p. 95–106), Knüsel and Outram (2004; 2006), Outram *et alii* (2005), Duday (2011), Ubelaker and Montaperto (2014), Knüsel and Robb (2016).

Once the processing of the archaeological information and the anthropological (re)analysis were finalized, the two sets of data were correlated, before attempting to identify in the field photo the individuals resulting from the new anthropological analysis.

ARCHAEOLOGICAL DATA

Description of the archaeological feature

Combining the information from various sources (field notes – see Annex 1, published data, and photos from the archive of the Institute of Archaeology in Bucharest[7] – see Annex 2), we can provide the following chart-type description of the feature:

[7] The Archive of the "Vasile Pârvan" Institute of Archaeology in Bucharest, Morintz Fund, Cernavodă photos (without inventory number).

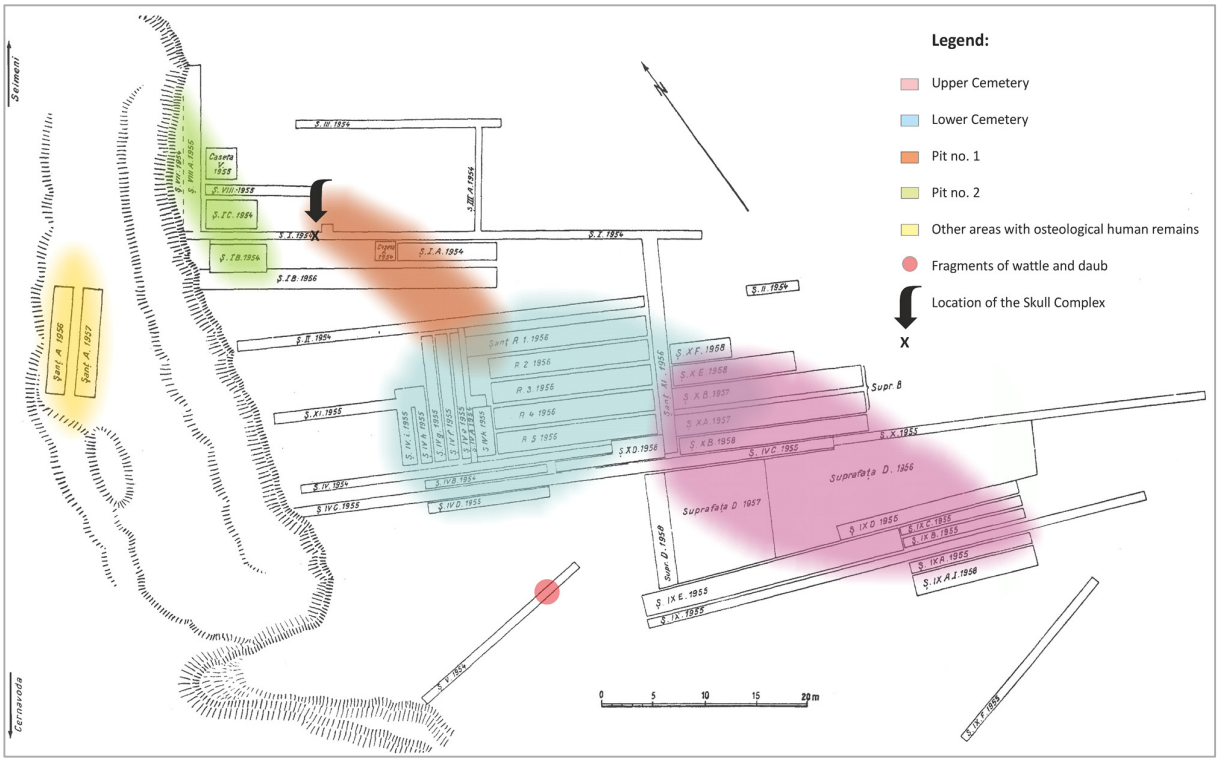

Figure 2. *The internal structure of the burial ground.*

Name: Skull Complex / Feature A

Year of discovery: 1954

Location: Cernavodă – *Columbia D*, Trench S I, sq. 6 and 7, -0.35 -0.53 m (or -0.40 -0.50 m) (Fig. 2). This location places the feature in what has been identified within the cemetery as Pit no. 1.

Layout (Fig. 3): fragments from six skulls (and some other human bones) were recorded in the field, accompanied by a large stone, an animal bone, mussel shells, a smaller stone artefact and a pottery sherd. The skulls appear to have been arranged in two rows, oriented north-south. They were assigned numbers in the field, counterclockwise, from 1 to 6. Their arrangement, according to the photos, drawing and description is as follows:

Western row (from north to south):

Skull 1: *calvaria* fallen on the right side facing north-west[8]. Under the larger piece of the *calvaria*, other smaller skull fragments were identified. No trace of violence on the bones. The skull was placed directly on the yellow-brownish soil. There was 0.25 m between Skull 1 and Skull 2.

Human long bone: tibia (?) fragment located between Skull 1 and Skull 2[9].

Skull 2: placed with the top down, on the yellow-brownish soil. Skull facing north-east[10]. No mandible. No upper teeth. No traces of violence.

Human long bone: femur fragment, placed on top of Skull 2, almost in-between Skulls 2 and 3[11].

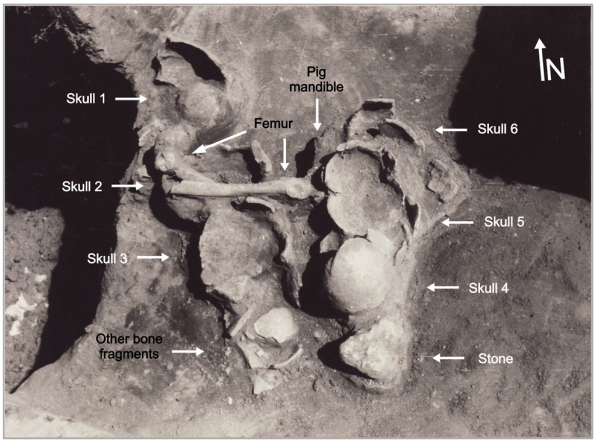

Figure 3. *The Skull Complex (archive photo) with the indication of the component parts based on a sketch from the field notes (see Annex 1).*

[8] The orientation mentioned in the field notes specifies south as the direction of the eye-sockets (see Annex 1, Description 5), but an analysis of the photos, correlated with the sketch, made possible the correction of this assertion.

[9] Not visible on any photo or drawing. It could be one of the many long bone fragments that do not appear in the photos or drawing but were accounted for in the bone sample.

[10] The orientation mentioned in the field notes specifies east as the direction of the eye-sockets (see Annex 1, Description 5), but an analysis of the photos, correlated with the sketch, made possible the correction of this assertion.

[11] This bone, as it appears on the photos, broken in two but complete, was not accounted for in the bone sample. For more details, see discussion on representation of bones.

Skull 3: placed near skull 2, on the same soil. Skull facing north-east[12]. Extremely fragmented. Small freshwater mussel shells grouped beneath it.

Other skull fragments: not marked separately on the drawing or in the field notes (probably because of the fragmented state of Skull 3), but distinguishable in the photos.

Eastern row (from south to north):

Stone: 'river stone' (boulder), irregular (length = 12.5 cm, width = 11 cm, thickness = 5 cm) apparently placed intentionally with the skulls. Small freshwater mussel shells and a piece of an upper jaw[13] were found beneath it.

Skull 4: placed at the same level with the other skulls, with the top up, facing north-west[14].

Skull 5: placed slightly higher up than skull 4, upside-down, facing north-west. Fragmentary.

Skull 6: fragmentary, only *calvaria* represented. A small piece of the upper jaw was found in-between the fragments. Facing south/south-west[15].

A pig mandible was deposited in-between the two rows of skulls, in the middle. Unfortunately, it has not been preserved.

A small white elongated stone-like object (?) was packed with the bones of Skull 6 (Inv. no. F 363, Fig. 4). Petrographically, the object is a fragment of carbonatic concretion, white on the exterior, yellowish on the interior, with concentric, very homogenous, compact structure and irregular outer surface. It appears to be a cave calcitic concretion[16].

Figure 4. *Stone artefact from the Skull Complex.*

A pottery sherd (Inv. no. F 185) was probably mistaken for a skull fragment and was packed with the bones of Individual 10 (a?, b?, c?) (Fig. 5). The sherd comes from a pot with a diameter of ca. 60 cm, made of coarse paste with grog and grit as temper. The pot was burned in an incomplete oxidizing atmosphere and the surface was smoothed. It presents the characteristics of Hamangia-type pottery but lacks any decoration[17] – no further details are available.

No later disturbances affected the feature.

Figure 5. *Pottery fragment from the Skull Complex.*

Stratigraphy and dating

Stratigraphy

The stratigraphy of the section where the Skull Complex was found is unclear owing to the missing plans of that part of the site. Both published information and field notes suggest that Trench S I (50 m × 0.80 m) crossed several natural ravines filled (both naturally and intentionally) with archaeological materials. While the published description of the situation indicates two such ravines and identifies them as "ritual pits" nos. 1 and 2, the analysis of the field notes points toward the existence of three such ravines intercepted by Trench S I. Based on the published data, the feature was located within the Ritual pit no. 1 (Morintz *et alii* 1955, p. 154).

[12] The orientation mentioned in the field notes specifies east as the direction of the eye-sockets (see Annex 1, Description 5), but an analysis of the photos, correlated with the sketch, made possible the correction of this assertion.

[13] The field notes reported small mussel shells beneath Skull 3 and a small fragment of the upper jaw in-between the pieces of Skull 6. The published data located them under the rock. It is difficult to assess the correct version. Normally, we would consider the field notes to be correct, as being the primary registration of the facts. But a more detailed description of the feature was provided by D. Berciu, on 4th of June, written almost a week following the drawing of the feature and the primary observations made by S. Morintz on 28th of May (observations that were not found in Morintz's field notes) (see Annex 1).

[14] The orientation mentioned in the field notes specifies west as the direction of the eye-sockets (see Annex 1, Description 5), but an analysis of the photos, correlated with the sketch, made possible the correction of this assertion.

[15] Orientation inferred from the photos and sketch analysis.

[16] The determination of the object was made by dr. Constantin Haită from the National Museum of Romanian History, Bucharest.

[17] The pottery analysis was performed by dr. Cristian Eduard Ştefan from "Vasile Pârvan" Institute of Archaeology, Bucharest.

The field notes (Morintz 1954) provide a more refined, but still incomplete picture. The general stratigraphy of Trench S I comprised two layers, a darker (black) upper layer and a yellowish layer beneath it. The yellowish layer also contained archaeological finds such as pottery and human bones, but to a lesser degree than the upper layer. Based on the general assessment of the pottery fragments in the field, the yellowish layer was assigned to an older phase of the Hamangia culture, and the darker layer to a more recent one that had also partially disturbed the earlier one. Occasional earlier material found toward the surface was explained in terms of landslides. There seems to be a lack of consistency in the use of the term "virgin soil", referring both to the yellowish layer that still contained some archaeological remains and to other geological layers without archaeological remains. Regardless, the description of the S I profile indicates the following (25 squares numbered from west to east, 2 m long each) (Morintz 1954, p. 108–116, 121–127):

- within sq. 1–5: the cultural layer extended further down than in sq. 6–7 (see below);
- sq. 6–7: the virgin soil was encountered at less than 1 m;
- sq. 8: ??? (no info);
- sq. 9–12: somewhere between -1.15 -1.50 m was noted the transition from the dark to the yellowish layer; sq. 12 was excavated down to -1.85 in the yellow layer, with materials assigned to the earlier phase; virgin soil was encountered at a shallower depth than in sq. 19–20 (see below);
- sq. 13–15: the limit between the darker layer and the yellowish one was around -1.35 -1.45 m;
- sq. 16–18: at -1.30 -1.50 m rare materials (pottery fragments, a skull) were found within the yellowish layer;
- sq. 18/sq. 19: the yellowish layer observed at -2.30 m;
- sq. 19–20: numerous freshwater mussel shells, pottery fragments and bones were found mainly below -1.50 m; virgin soil had not been reached at -2.60 m;
- sq. 21–24: ??? (no info);
- sq. 25: virgin soil was reached at approximately 3 m; rare archaeological materials were noted in the yellowish layer, between -1.00 -1.50 -3.00 m.

From the description above, it would seem that the Skull Complex, found in sq. 6 or 7 (where the dark layer appears to be the thinnest), at a lower depth (-0.30 -0.50 m), would have been located either on the edge of one of the ravines (Pit. no. 1), or immediately to the west, outside of it.

In the same trench, another intentional deposition of human bones (including a skull) and animal bones was noted in sq. 13 at -1.00 m, which would also place it inside Pit no. 1 (Morintz 1954, p. 114).

Dating

Since the Skull Complex lacked chronologically diagnostic pottery, we decided to obtain AMS ^{14}C dates on three samples. The intention was to date both cranial elements and long bones, for which we chose two skulls with the temporal bone present and one of the more robust pieces of long bone. The results were the following:

Sample ID	Anthropological ID	Bone type	Lab. no.	^{14}C age	Calibration	δ^{13}C (‰)	δ^{15}N (‰)
CVD31	Skull 8	Right temporal	Poz-86549	**6260 ± 40 BP**	**5319–5076 cal BC**	-20.8	14.4
CVD32	Skull 9	Left temporal	Poz-86550	**6190 ± 40 BP**	**5291–5026 cal BC**	-20.2	15.7
CVD33	Skeleton 10	Humeral shaft	Poz-86552	**6135 ± 35 BP**	**5212–4989 cal BC**	-20.2	14.5

Table 1. *^{14}C dates and stable isotope measurements obtained on three samples from the Skull Complex. Calibrations performed with OxCal 4.3 using the IntCal13 dataset.*

The ^{14}C dates from Cernavodă calibrate as in Fig. 6 and Table 1. However, the dates may be too old due to regular fish consumption (this is suggested by the unusually high δ^{15}N value). The existence of a freshwater reservoir effect (FRE) resulting from dietary dependence on fish from the Danube was first suggested by Bonsall *et alii* (1997); Cook *et alii* (2001) quantified the FRE in human remains from Late Mesolithic Schela Cladovei in the Iron Gates region as +540 ± 70 yr for a 100% aquatic diet. Currently, however, we have no way of estimating or correcting for the FRE at Late Neolithic Cernavodă.

The calibrated dates for the Skull Complex are among the earliest when compared with the other dates available for the Hamangia culture (Fig. 6)[18]. It has to be kept in mind, though, that dates obtained on herbivores from Cheia and those on the human bones from Durankulak provided by the study from 2013 are thought to be unaffected by any marine reservoir effect (Honch *et alii* 2013, p. 150), while those from Cernavodă are to some degree affected by the FRE.

[18] We used the dates obtained on herbivores from the Hamangia III settlement at Cheia (Romania) (Voinea, Neagu 2008, p. 16; Bréhard, Bălăşescu 2012, Table 1; Balasse *et alii* 2014, p. 118–122), and the dates on human remains from Durankulak (Bulgaria) – various phases (Honch *et alii* 2013, p. 153), to which an older date on coal from the Hamangia III settlement at Baia – *Goloviţa* (Romania) was added (Vogel, Waterbolk 1963, p. 184). More dates for the Hamangia culture are available at http://www.14sea.org/, but we used here only dates that were associated with a cultural phase.

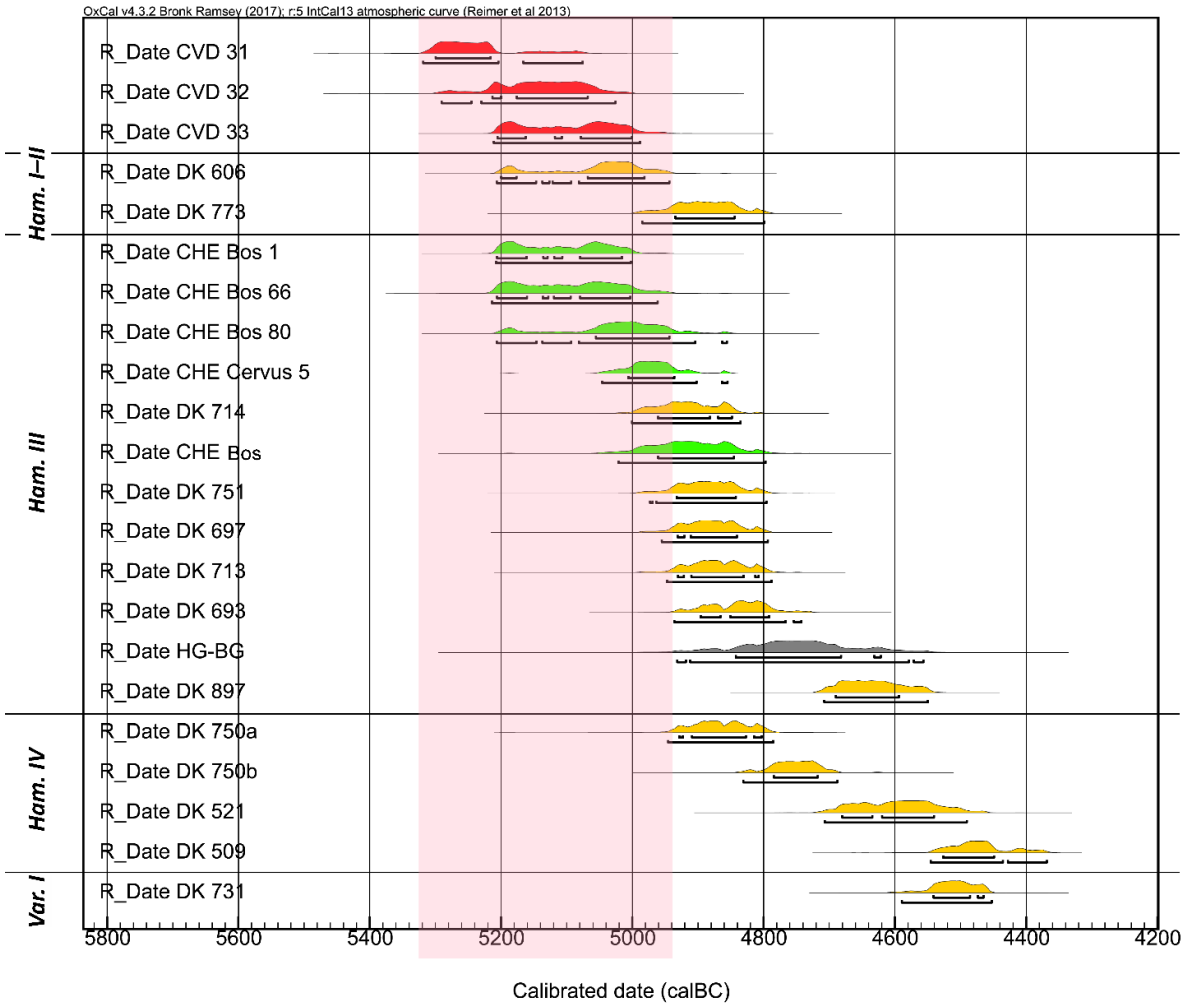

Figure 6. *Radiocarbon dates for the Hamangia culture. Red colour: samples from Cernavodă – Columbia D (human bones), yellow colour: human bone samples, green colour: herbivore bone samples, grey colour: coal sample. CVD = Cernavodă – Columbia D (Romania), CHE = Cheia (Romania), HG-BG = Hamangia/Baia – Goloviţa (Romania), DK = Durankulak (Bulgaria).*

Here it is worth noting that the recently published dates for the Late Neolithic cemetery at Cernica (Romania), which indicate the 5355–5215 cal BC interval for the functioning of this burial ground (without FRE) (Stratton *et alii* 2018, p. 17 and 23). At this point the Cernavodă burial ground closest in time to the Cernica one, perhaps slightly later (considering the FRE that cannot yet be estimated for Cernavodă).

BIOLOGICAL DATA

Skull 1[19] / Individual 8a[20]. Male, approximately 40 years old

Skull 1 (Individual 8a) is represented by a restored *calvaria* missing its lateral parts (they were reconstructed in wax in 1954). The temporal bones, with an incomplete squamous part, are also part of the osteological inventory, together with a sphenoid fragment and an occipital fragment (Fig. 7). The skull belonged to a male individual, with an age at death of approximately 40 years (middle-aged adult).

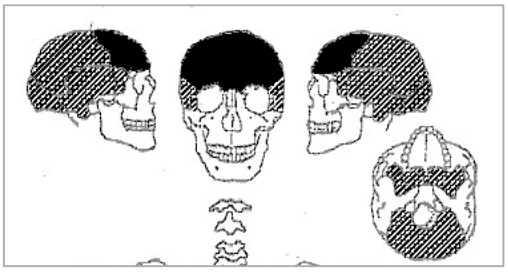

Figure 7. *Skull 1 / Subject 8a. Male, ca. 40 years old. Cranial bone inventory.*

[19] Skulls 1 to 6 refer to the numbers given by the excavators of the feature – see Annex 5.

[20] Individuals 8a-b, 9, 10a-e, 36a-b, 424b refer to the Anthropological IDs given in the 1950s and later completed by us – see Annex 5.

The cranial vault, examined from *norma verticalis*, has a brisoid shape (Pl. I/d), its antero-posterior diameter is large, while the transverse one is small. The cephalic index is hyperdolichocranic. The forehead has a medium to small size and an eurymetopic frontal-transverse index (Annex 6 – Table 2, Pl. I/a-b), oblique, quite inclined, with intermediary type crests. The occipital bone is high and bulged, with a slight pre-lambdoid depression (Pl. I/b-c). The glabellar relief is of the 4th towards the 5th degree, the supraciliary relief is of the 2nd degree, and the occipital relief presents a modest development. The mastoid processes are of the 3rd degree, which means a moderate volume (Pl. I/e).

Individual 8b. Probably male, 20–30 years old

The skull fragment was found in the bone collection. It is not certain that this fragment belonged to the Skull Complex. The first team of anthropologists did not mention the fragment, but this is not the only occurrence of the kind. The marking of the bone (reading C.V.8) is different from those on all the other remains (marked CVD …. / Cvd ….. / Cvdă …..), which also raises doubts about its provenance. Despite these inconsistences, we chose to present this fragment here, since it was found among the present collection and it could not be reassigned to any other collection of bones from the Faculty of Biology.

The fragment comes from the left parietal bone, from the posterior sagittal portion, from the proximity of the *foramen parietale* (Fig. 8, Pl. II/a-b). Maximum dimensions: 66 mm in length (in the antero-posterior direction) and 48 mm in width (in the transverse direction). The thickness of the bone wall is approximately 7 mm. The sagittal margin of the fragment is present and well preserved. According to the thickness of the parietal bone wall, the fragment belongs, most probably, to a male individual of approximately 20–30 years (young adult). The age was estimated from the obliteration degree of the *pars lambdica* sagittal segment.

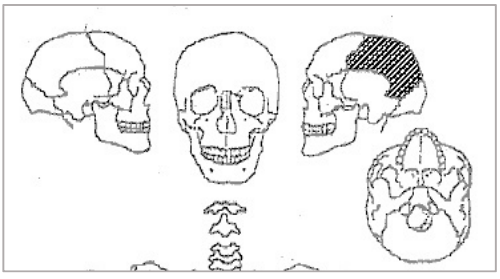

Figure 8. *Subject 8b. Probably male, 20–30 years old. Cranial bone inventory.*

Skull 2 / Individual 9. Male, 55–60 years old

This is represented by a *calvaria* that was reconstructed in 1954. The left temporal of which only the region of the mastoid process was preserved is attached to the parietal, and a small portion of the nasal bones is attached to the frontal bone (Fig. 9).

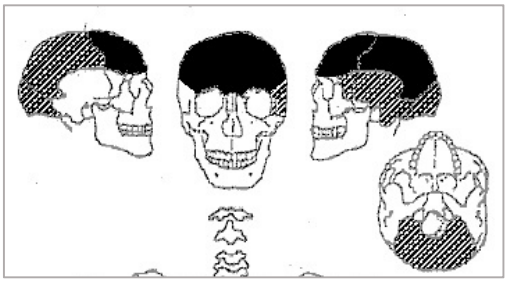

Figure 9. *Skull 2 / Subject 9. Male, 55–60 years old. Cranial bone inventory.*

The skull belonged to a male individual of approximately 55–60 years (older adult). We identified some signs of degenerative skeletal changes, such as external auditory exostosis, the formation of which can be related to the advanced age or to intensive diving for fishing.

The cranial vault, examined in *norma verticalis*, has a brisoid shape (Pl. III/d). According to its main dimensions, it can be characterized as high, very long and very large. The cephalic indexes are mesocranic, orthochranic and tapeinochranic. The forehead is moderately large and narrow, stenometopic towards metriometopic (Annex 6 – Table 2), with intermediary type crests and a little inclined (Pl. III/a, c). The occipital is bulged and high (Pl. III/b-c). The glabellar and supraciliary reliefs are well developed. The mastoid processes are very large, of the 5th degree (Pl. III/c). The route of the nasal bones – the only portion of the facial skeleton that was preserved – indicates a prominent bridge of the nose and a profound/deep root (Pl. III/a, c).

Skull 3 /Individual 10a. Male, approximately 40 years old

Only the upper part of the cranial vault remained of Skull 3 / Individual 10a, that is the posterior part of the frontal bone, the medial part of the parietal bones and the superior region of the occipital (Fig. 10). The skull belonged to a male individual with an age at death of approximately 40 years (middle-aged adult).

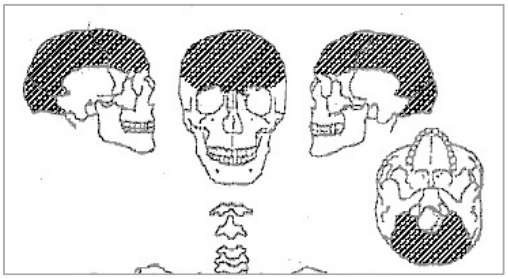

Figure 10. *Skull 3 / Subject 10a. Male, ca. 40 years old. Cranial bone inventory.*

The only biometric data recorded are those from the *bregma* and *lambda* cranial points, which are the sagittal parietal arch and the sagittal parietal chord, the ratio

between these two indicating a weak to moderate parietal curvature (Annex 6 – Table 2). The thickness of the parietal bones in the medial region varies between 9 and 11 mm, and of 10 mm in the proximity of the coronal suture. These values indicate, without any doubt, a male subject. The skull to which these bones belonged must have been of large size, both on the anterior-posterior and transverse directions (Pl. II/c-d). It is possible that the cephalic index was meso-brachycranic. We noted the presence of two accessory ossicles of small size on the left half of the lambdoid suture.

The maximum dimensions of this reconstructed cranial vault are: 189 mm in the sagittal plane and 140 mm in the transverse plane.

Individual 10b. Infant, 12–16 ± 4 months old

The cranium is represented only by three fragments from the medial part of the parietal bones (Pl. IV/a). The upper left maxilla with two unerupted teeth conserved in the alveoli (a temporary canine and a fragment of temporary first molar) was also preserved. (Fig. 11, Pl. IV/b). The rest of the teeth fell postmortem and are missing from the sample.

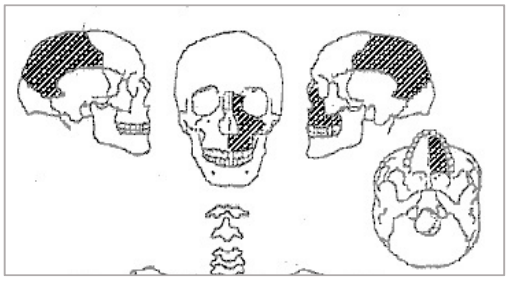

Figure 11. *Subject 10b. Infant, 12–16 month. Cranial bone inventory.*

The skeletal remains belonged to a sub-adult individual, with an age at death of approximately 12–16 ± 4 months (infant), undetermined sex. The age was estimated from the eruption stage of the surviving deciduous teeth: at the moment of death, the central and lateral incisors had erupted, the canine was about to erupt, and the first molar was still in the socket, with the crown almost calcified (Pl. IV/b). There were no pathological conditions identified either at dentition level or on the cranial remains.

Individual 10c. Probably female, approximately 40 years old

Only two fragments from the skull of the Individual 10c were present in the sample – one from the frontal bone (frontal *bossae*) and one from the right parietal, from the area of the coronal suture. These were rearticulated in 1954 (Fig. 12, Pl. IV/c).

The reconstructed cranial fragment belonged (probably) to a female individual with an age at death of approximately 40 years (middle-aged adult). The forehead seems to have been quite bulged and relatively large. Signs of degenerative skeletal changes are missing. The maximum dimensions of this reconstructed cranial fragment are: 127 mm in the anterior-posterior plane and 99 mm in the transverse plane.

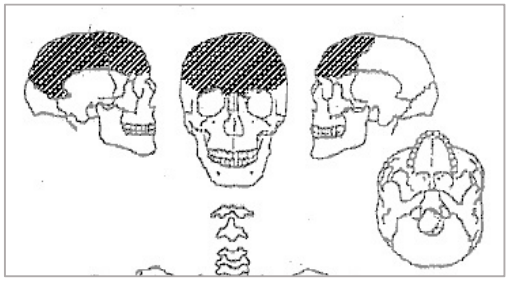

Figure 12. *Subject 10c. Probably female, ca. 40 years old. Cranial bone inventory.*

Individual 10d. Probably male, 20–30 years old

The cranial remains attributed to Individual 10d come from the frontal bone (the medial posterior area from the vicinity of the coronal suture), the anterior portion of the left parietal (from the proximity of the coronal and sagittal sutures) and the posterior portion of the left parietal (from the proximity of the sagittal and lambdoid sutures). The complete left zygomatic is also present (Fig. 13, Pl. IV/d-e).

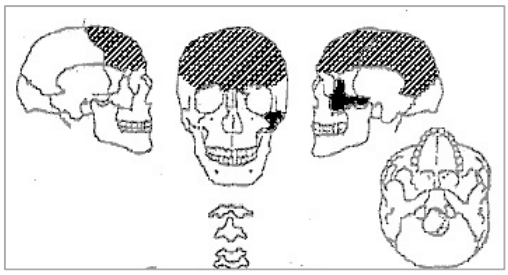

Figure 13. *Subject 10d. Probably male, 20–30 years old. Cranial bone inventory.*

These remains come from a (probably) male individual with an age at death between 20 and 30 years (young adult). The zygomatic bone is quite massive and high, with moderate relief (Pl. IV/e). No signs of degenerative skeletal changes were identified.

Individual 10e. Probably male, 55–60 years old

Only six fragments are present from the skull attributed to Individual 10e: five fragments from the parietal bones and one from the occipital, from the area of the *inion* cranial point and of the nuchal muscle insertions (Fig. 14). Some fragments were rearticulated and reconstituted in 1954 (Pl. IV/f).

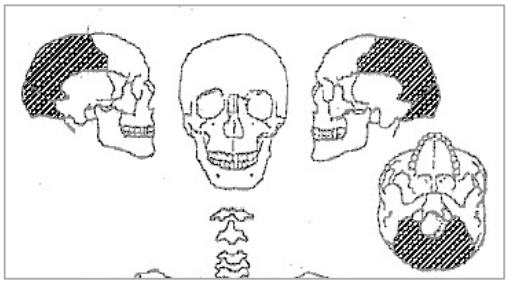

Figure 14. *Subject 10e. Probably male, 55–60 years old. Cranial bone inventory.*

These remains belonged to a (probably) male individual of approximately 55–60 years (older adult).

The occipital bone is robust and does not seem to be too bulged. The external occipital protuberance is moderate, of the 3rd degree (Pl. IV/f). Further observations were not possible.

Skull 4 /Individual 36a. Male, 40–45 years old

This is represented by a *calvaria* reconstructed in 1954 by O. Necrasov and subsequently completed by the present authors with two other fragments of considerable size from the right parietal, the area of insertion of the *temporal fascia* muscular fascicle.

The *calvaria* belonged to a 40–45 years old male individual (middle-aged adult) (Fig. 15). There are no signs of degenerative skeletal changes or any other involutive pathological changes.

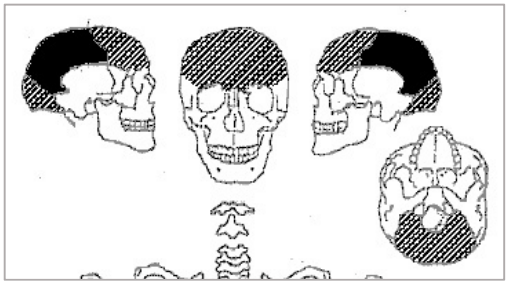

Figure 15. *Skull 4 / Subject 36a. Male, 40–45 years old. Cranial bone inventory.*

The neurocranium, viewed from the *norma verticalis*, has an ovoid shape (Pl. V/d). The measurable dimensions indicate a large width, moderate length, and mesocranic or, at most, moderate dolichocranic cephalic index. The forehead is large (Annex 6 – Table 2), slightly oblique, quite inclined, and with intermediary type crests (Pl. V/a-b). The occipital is bulged and moderately high, having a slight suprainion depression and with accentuated nuchal muscle insertions (Pl. V/b-c).

Skull 5 / Individual 424b. Female, 50–55 years old

This is represented by a *calvaria* missing its lateral parts. It was reconstructed by the present authors. The skull belonged to a female individual with an age at death of approximately 50–55 years (older adult) (Fig. 16).

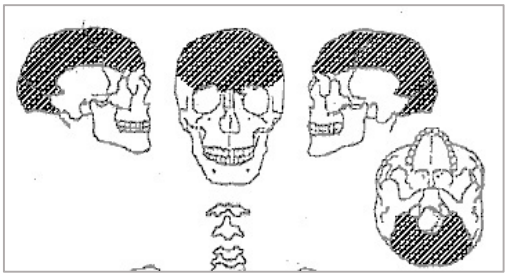

Figure 16. *Skull 5 / Subject 424b. Female, 50–55 years old. Cranial bone inventory.*

The neurocranium, examined in *norma verticalis*, has an ovoid shape (Pl. VI/d). Its length and width are medium. Its height seems quite large. The cephalic index is, probably, dolichocranic. The forehead is very large and very slightly inclined (Pl. VI/a-b), and the occipital is bulged and moderately high and large (Annex 6 – Table 2; Pl. VI/b-c).

Skull 6/Individual 36b. Female, 20–25 years old

This is represented by a fragment of *calvaria* that includes the left half of the frontal bone, the left parietal, the right parietal (without the anterior area) and a fragment of the left temporal, from the area of the mastoid process (Fig. 17). These fragments of *calvaria* were reconstructed by O. Necrasov in 1954.

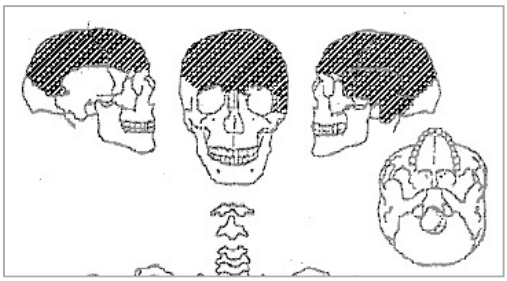

Figure 17. *Skull 6 / Subject 36b. Female, 20–25 years old. Cranial bone inventory.*

The skull belongs to a female individual of approximately 20–25 years (young adult).

The neurocranium must have been quite long and moderately large (probably dolichocranic) (Pl. VII/b). The forehead seems bulged and relatively large (Pl. VII/a, c). The mastoid process has a moderate volume (the 3rd degree of development) and moderate mastoid muscle insertions (Pl. VII/d). The only biometric data are those concerning the chord and the arch between the *bregma* and the *lambda* (Annex 6 – Table 2). Signs of degenerative skeletal changes are absent.

Osteological remains of uncertain attribution

This category includes all postcranial fragments, the mandible body and three isolated teeth. During the 1954 analysis, most of these remains were attributed by O. Necrasov to various individuals, especially to the "10" group from the Skull Complex and only some of them were omitted. Most of them are still present in the osteological collection. Although they were labelled as belonging to the Skull Complex, several remains were not mentioned by either the archaeologists or the anthropologists who undertook the first analysis. For more details, see Annex 7.

Recent methods of analysis for commingled human remains led us to take a different approach from that adopted in 1954. Thus, each bone fragment was analysed separately, initially without being attributed to any individual in the feature. When the inventory chart was completed, it became evident that there were no duplicates among the non-attributed remains, neither from the perspective of the anatomical area, nor from the point of view of laterality of bones (Fig. 18). In addition, all these remains have a moderate robusticity and present male or probably male features. There are only a few exceptions where the sex could not be determined, not even with probability, due to the high degree of fragmentation, or the complete absence of the elements that could have offered any clues. In terms of biological age, all the non-attributed remains fall in the 20–50 years interval.

Within the constraints imposed by the incomplete osteological inventory, the fragmented state of the bones and the absence of some important skeletal elements, we suggest that these remains may have belonged to only one individual – a male with age at death between 20 and 50 years. From the perspective of the Skull Complex, this suggests a possible association with Individual 8a (Skull 1), Individual 10d or Individual 36a (Skull 4). We initially considered also Individual 8b (C.V.8, the burned fragment) and Subject 10a (Skull 3) but eliminated them for the following reasons: the find context of the C.V.8 fragment and the particular characteristics of the skull of Individual 10a (the postmortem calotte removal, polishing and trepanation).

Although it is likely these remains belonged to only one male individual, below they will be described separately:

Mandible body, fragment. Adult, undetermined sex. The fragment belongs to the right horizontal portion of the mandible body and has the alveoli areas of the incisors, canine and premolars partially preserved (Pl. VIII/a).

Isolated teeth. Three isolated teeth were identified: a lower left first or second premolar (young adult, undetermined sex), an upper left second molar (young adult, undetermined sex) and an upper left second premolar (middle-aged adult, probably male[21]) (Pl. VIII/b).

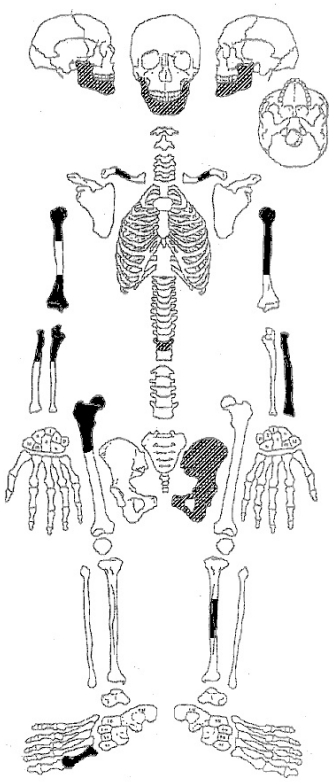

Figure 18. *Osteological remains with uncertain attribution. Bone inventory.*

Unidentified cranial fragments. Adult, undetermined sex. Due to the small dimensions and to the absence of clear indices concerning the anatomic position, a number of 11 cranial fragments remained unidentified (Pl. VIII/c).

T11 thoracic vertebra. Young adult, undetermined sex. The vertebra is well preserved. Only the facet joint of the corpus suffered postmortem damage (Pl. IX/h).

Right clavicle, fragment. Adult, undetermined sex. The fragment comes from the medial area (Pl. VIII/d).

Left clavicle (left clavicle), fragment. Adult, undetermined sex. The fragment comes from the medial area (Pl. VIII/e).

Left coxal bone, fragment. Young adult, male. The fragment includes a quite well-preserved ischium, with the ischial tuberosity, the obturator foramen, and part of the acetabulum (Annex 6 – Table 3) (Pl. IX/j).

Left humerus. Adult, male. Two large fragments are present: one from the proximal half, including the

[21] Sex determination was done according to the tooth size (maximum mesiodistal and buccolingual dimensions), according to Banerjee *et alii* (2016).

epiphysis (Pl. IX/c) and the other one from the medial part (Pl. IX/d). The humeral head is large, and the deltoid muscle insertions are well marked. The section index of the diaphysis indicates an eurybrachic humerus (Annex 6 – Table 3).

Right humerus. Adult, male. Two large fragments are present: one from the proximal third of the shaft (Pl. IX/a) and the other one from the area of the meta-diaphyseal distal region (Pl. IX/b). The section index of the diaphysis indicates an eurybrachic humerus (Annex 6 – Table 3).

Left radius. Adult, male. The medial and distal thirds are very well preserved (Pl. IX/e) (Annex 6 – Table 3). The distal joint surface is quite large. Another small fragment from the radial tuberosity comes, probably, from the same bone (Pl. IX/f).

Right radius. Adult, undetermined sex. This bone is represented only by a small fragment from the proximal third part, the area of radial tuberosity (Pl. IX/f).

Right ulna. Adult. The sample includes a fragment from the proximal third part[22] (Pl. IX/g).

Right femur. Adult, male. The right hip bone is represented by a large fragment from the proximal meta-diaphyseal region. The femoral head is large (Pl. IX/k) (Annex 6 – Table 3).

Left tibia. Adult, undetermined sex. Only a part of the medial diaphyseal portion was preserved (Pl. IX/i). The section index of the diaphysis indicates a platycnemic tibia (Annex 6 – Table 3).

First metatarsal bone. Adult, male. The bone is complete and very well preserved. Its dimensions put it in the "large" category (Pl. IX/l) (Annex 6 – Table 3).

Unidentified postcranial fragments. Adult, undetermined sex. Due to the small size of the fragments and to the lack of clear clues as to their anatomical location, three postcranial fragments remained unidentified.

PATHOLOGICAL ANALYSES

Porotic hyperostosis

Porotic hyperostosis, also called *cribra cranii externa*, is present on the entire surface of the occipital of Skull 1 / Individual 8a (male, approximately 40 years) (Fig. 19/a). The same type of porosity was identified on Skull 2 / Individual 9 (male, 55–60 years), on the frontal bone, above the right orbit, on the supraciliary ridge (Fig. 19/b), and also on Skull 4 / Individual 36a (male, 40–45 years), on the frontal and parietal bones, inclusively in the proximity of the coronal and sagittal sutures (Fig. 19/c). In all these three cases, the *cribra cranii* is of porotic type (Nathan and Haas 1966), the foramens are small and spread on the bone surface (Stuart-Macadam 1991), being barely visible (Buikstra and Ubelaker 1994, 120–121) and inactive at the time of death.

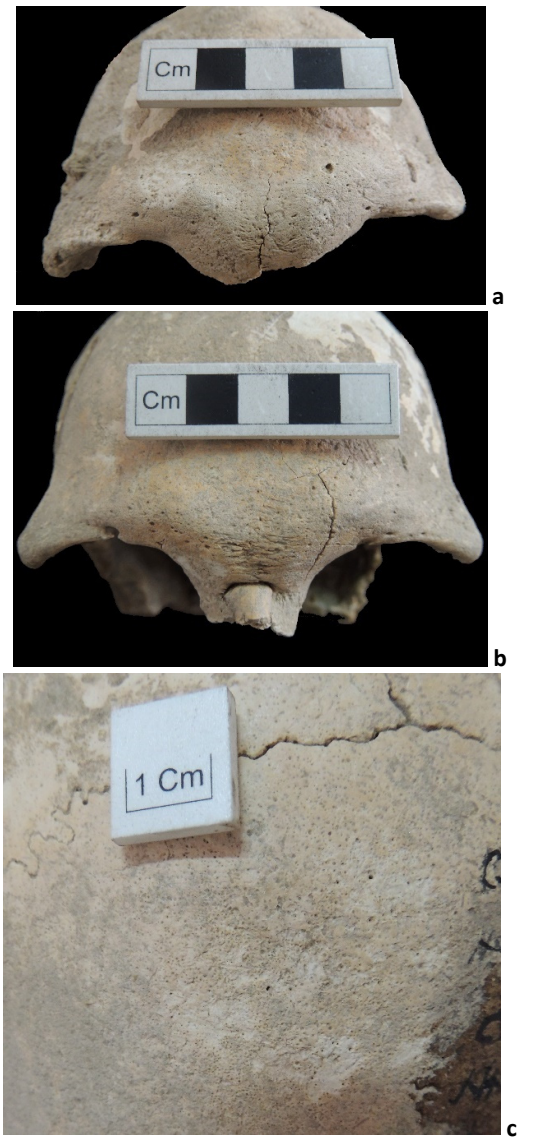

Figure 19. *a. Skull 1 / Subject 8a, male, ca. 40 years old: porotic hyperostosis; b. Skull 2 / Subject 9, male, 55–60 years old: porotic hyperostosis; c. Skull 4 / Subject 36a, male, 40–45 years old: frontal bone, cribra cranii.*

The appearance of the porosity itself can be an instrument in the evaluation of the health and nutritional levels of a community, being an indirect indicator of the quality of life at a given moment in a population, suggesting possible nutritional deficiencies and harsh living conditions (Walker *et alii* 2009). The porosities localized on *tabula externa ossis cranii* develop mainly during early childhood (Piontek and Kozlowski 2002),

[22] The bone is, today, in a slightly reduced state, since it underwent sampling for ^{14}C and DNA analysis (unsuccessful).

being less frequent among the adolescents and much rarer among adults (Stuart-Macadam 1985; Mays 1998, p. 142–145).

In the absence of information concerning the generalization of the porotic lesions on the entire skeletal system and of a possible association with other physiological stress indicators (such as dental hypoplasia or Harris lines), we are forced to invoke iron deficiency anaemia as the main possible cause for the appearance of the *porotic hyperostosis*. The iron deficit can be induced by lack of iron in the diet, or by its malabsorption and/or non-metabolization. There is a direct correlation between acute gastro-intestinal or parasitic infections and the quantity of iron, these two influencing each other. On the one hand, the diarrheic gastro-intestinal diseases "devour" the iron reserves of the organism, and on the other hand, iron deficiency predisposes the organism (infant, juvenile or adult) to infectious and parasitic diseases (Ortner 2003, p. 102–107). There are also opinions according to which an increased incidence of the exocranial porosities in a population can reflect a certain defence mechanism of the organism against harsh living conditions: in an organism infected with viruses, bacteria or mycoses, a self-defence mechanism is activated which reduces the iron quantity in the blood so that the iron "devouring" microorganisms remain without nutritive supplies and have their vital potential reduced (Stuart-Macadam 1992).

We noted that in the case of Skull 2 / Individual 9, the location of the porosity in the supraciliary area can indicate, besides iron deficiency anaemia, the presence of an inflammatory or infectious process in the same area or a series of secondary disseminations of the inflammatory processes in the area of the skull and/or scalp (Ortner 2003, p. 102–107).

Osteolytic lesion (benign tumour cyst)

The left parietal of Individual 10d (male, 20–30 years old), presents an oval concave depression in the anterior portion (approximately medial), located at 36 mm from the coronal suture and at 21 mm from the sagittal suture. The defect is incomplete; only the external cranial bone layer is missing and approximately 75% of the *diploë* (Fig. 20/a). There is no correspondence on the *endocranium*; the internal cranial bone layer is intact. The margins of this incomplete opening are quite regular, and three fine fissures emanate from the margins. There are no visible signs of bone remodelling. The remaining *diploë* layer is easily visible (Fig. 20/b). All these characteristics suggest that the defect is, in fact, an incomplete concave natural perforation, resulting from an infection that was still active at the moment of death. There is no technological stigma, of percussion or rotation, at the periphery of the perforation or on its internal walls (Fig. 20/c)[23].

Figure 20. *Subject 10d, probably male, 20–30 years old: a. Left parietal bone, osteolytic lesion; b. Detail of the osteolithic lesion (magnified 25x) (photo by Monica Mărgărit); c. The margin of the defect, detail (magnified 50x) (photo by Monica Mărgărit).*

The concavity is, in fact, an osteolytic lesion, with a well delimited surface, that can be assigned to the category of benign, unicameral tumoral cysts, without signs of becoming malignant. The cyst developed epidermally, proliferating through the osseous tissue and remaining localized only at the level of *calvaria*. This formation is singular, at least with respect to the bones present in the osteological inventory. In anatomical terms, the cyst is a lesion characterized by a cavity filled with

[23] The use-wear analysis performed by Monica Mărgărit and Andreea Vornicu.

liquid surrounded by a distinct wall of approximately 10 mm on the sagittal direction and 5 mm on the transverse direction. The cyst probably formed out of ectodermal epithelial cells (Ortner 2003, p. 504–506). No sign of trauma was identified on the cranial remains in the osteological inventory.

MINIMUM NUMBER OF INDIVIDUALS (MNI)

Considering the context of discovery of the analysed bones, the osteological inventory, and the fact that the remains were commingled[24], in order to calculate the MNI we first identified the anatomical parts, and then established the laterality of the osteological remains. The development stages (sub-adult, adult) and the morphoscopic characteristics of each anatomical area (robusticity, thickness of the bone wall) were also taken into consideration. These last observations helped to establish, even though in part subjectively, the incompatibilities between fragments.

All skeletal remains found as part of the Skull Complex are presented in Annex 8 grouped by age category (sub-adults and adults). Fifty-five human skeletal remains (complete, restorable or fragmentary) and three dental units were identified. The most frequent element is the left parietal bone (nine adult elements and a sub-adult one). Given the fragmentation of the skeletal elements (including the parietals), we should mention that the most frequent region of the left parietal was considered, which is the medial-posterior one, from the proximity of the sagittal margin of the bone, where *foramen parietale* can be found – an inconstant foramen through which *vena emissaria parietalis* passes.

Thus, according to the method for calculating the MNI, the skeletal remains of at least 10 different individuals were identified as part of the Skull Complex. It should be noted that from one of the skulls, the left parietal is missing from the skeletal inventory (Individual 10c). Considering the morphoscopic characteristics of the other bones belonging to this individual, we consider that the preserved elements are not compatible with the rest of the skulls from the feature. Consequently, the probable number of individuals whose remains form the feature is 11. Of the 11 individuals, one is an infant (0–3 years old), three are young-adults (20–34 years old), four are middle-aged adults (35–49 years old) and three are older adults (over 50 years old). Of the 10 adult individuals, seven are males (four are certain and three are probable) and three females (two certain and one probable). The range of the age at death is quite large. The minimum age is approximately 12–16 ± 4 months, and the maximum age is 55–60 years, which means at least three generations.

Therefore, the new morphoscopic and biometric observations have led to the re-evaluation of the number of individuals to whom the remains from the Skull Complex belonged. The total number of individuals is higher (11 individuals) in our study compared to the analysis performed by O. Necrasov in 1954 (seven individuals).

TAPHONOMIC ANALYSIS

The taphonomic analysis was performed on bones that had been removed from their original archaeological context and preserved in a storage area up to the present day. All skeletal remains suffered postmortem modifications produced during the processes of primary exhumation and re-burial, within the burial environment, and also during excavation, shipment to the laboratory, and storage. To this can be added the repeated manipulation during (re)analysis, exposure to various temperatures, and also cleaning (brushing) under running water that attenuated or removed some of the clues concerning various taphonomic changes. The effect of these numerous processes is cumulative, which means that the alteration patterns are overlapped and mingled, which, in turn, makes even more difficult the interpretation of the taphonomic history.

The surface of the bones was analysed in the laboratory, first with the naked eye, then with the aid of a binocular magnifying glass, in order to record any modification produced by the environmental conditions in which the bones lay over a considerable time.

Conservation state

The state of preservation of the bone remains is, generally, satisfactory (Annex 9). Of the 11 individuals to whom the remains were assigned, none is 100% complete. Even when we analysed separately the representation of the cranial and postcranial segments, the picture is the same: six skulls are partially represented (between 25–75%), and the representation is very weak (under 25%) in the other five cases (Annex 9).

Weathering

The effects of subaerial weathering are visible on all the remains. The calcareous depositions are of moderate consistency, their severity varying between the 1st and 3rd degree (Buikstra and Ubelaker 1994, p. 98) (Annex 9). There are situations in which both weak and severe alterations were recorded on the same bone or fragment, such as in the case of Skulls 2, 5, and 6 and Individual 10d. On Skull 2, for example, the depositions are more severe

[24] Commingled skeletal remains = mixing of whole or fragmented skeletal elements or more individuals in a single context (Ubelaker 2002).

on the frontal and parietals and weaker on the occipital and left temporal. On Skulls 5 and 6, the difference between the bones concerning the severity of alterations is insignificant, but they become evident when we compare the two cranial walls (more consistent depositions on the internal wall and weaker on the external one). The traces of subaerial weathering are quite severe on the neurocranial fragments of Individual 10d (the calcareous deposition being more consistent on the external wall compared to the internal one), and weak on the fragment from the facial skeleton (the left zygomatic bone). The calcareous depositions on the postcranial remains with uncertain attribution are adherent and consistent, the fragments of humeri, left radius, right femur, left tibia and the first right metatarsal being affected more severely.

No skeletal element presents traces of aerial weathering, such as cracking or peeling of the bone surface, which means that neither during decomposition, nor after the partial decomposition, were they exposed to the direct action of the sun, rain, temperature changes or humidity.

Breakage patterns

The analysis of the breakage patterns helps us establish, with a fair degree of probability, the time interval between the moment of death and the moment of breakage of the bones. All breakage and fissures that led to the fragmentation of the skeletal elements from the Skull Complex were produced postmortem, most of them in the remote past, quite soon after disarticulation, when the bone was dry, partially mineralized, with reduced collagen content and relatively fragile. The contour of the fractures is helical, the margins are square-edged, irregular, undulating, forming a more or less right angle to their fracture surface. The surface of the breakage lines is rough and irregular, undulated, with spicules of bone protruding from them (Knüsel, Robb 2016, p. 10). The situation is valid both for the cranial remains attributed to particular individuals and for the postcranial remains with uncertain attribution. The presence of "dry bone fractures" shows us that the bones, having still enough collagen in their structure, were disturbed after their first burial. Calcareous depositions are present in a consistent layer inclusively on the old break lines. For example, in the case of Skull 1, Individual 8b and Individual 10d, they appear on the surface of disarticulated cranial sutures, the thickness of the calcareous layer being the same as the one from the break lines or from the surface of the bone. No perimortem breaks were identified. With the exception of Skull 3, in all the other cases, besides the old postmortem breaks (which have an eburnated aspect, with a continuous layer of depositions from the break to the bone surface), new, fresh fissures and breaks were also identified (Annex 9). These were produced during excavation, cleaning and storage of the bones.

Articulation

Of the minimum number of individuals (11), in only four cases (Individuals 8b, 10b, 10e and the remains with uncertain attribution) there is no articulation between bones or skeletal fragments. In the other seven cases, the skeletal elements present either certain articulation (Skulls 2, 3, 4, and 5 and Individual 10c), or partial articulation (Skulls 1 and 6 and Individual 10d). We must keep in mind, however, that none of the 11 individuals is represented by the entire skeleton (Annex 9). All disarticulations were produced postmortem.

Natural agents

The absence of carnivore bite marks or rodent tooth scratches, gnawing, and tooth punctures suggests that, prior to their final deposition, these remains were not exposed in a green state, which prevented the access of these agents to the bones.

Root-etching on the bone surfaces, even though not very evident and present only on some of the skeletal elements, is present, forming a dendritic network ("macaroni" patterns).

Burning traces

Burning traces are present on only one fragment (marked C.V.8 and attributed to Individual 8b), belonging to the left parietal. A consistent calcareous layer from the deposition context was present on the entire preserved surface, on both cranial walls. In order to record the state of the bone at the time of burning (green[25] or dry[26]), and to visualize more clearly all its characteristics, the fragment was partially cleaned by ultrasonic descaling (for details, see the sub-chapter *Materials and methods*) (Fig. 21/a). Thus, the burning temperature, estimated morphoscopically according to the RGB colour scale (Walker *et alii* 2008), indicates a temperature range between 200 and 400°C (Fig. 21/b). The external bone wall is black, which means a maximum temperature of 300-400°C (charring). The internal bone wall varies between reddish-brown (100°C) and dark brown (200°C) (Fig. 21). Some extremely fine and superficial, almost subtle, fissures are present (they became visible only after

[25] The term "green bone" refers to bone that is fresh at the time of cremation, covered in muscle and teguments and with a full medullary cavity. The osteological remains that form this category come from individuals cremated *in vivo* or immediately postmortem, in this last group entering both corpses and partially defleshed bones.

[26] The term "dry bone" refers to the old, dehydrated bone which over time lost most of its organic components and which, at the cremation moment, is not covered in muscle tissue and no longer contains marrow. This category includes only the osteological remains cremated postmortem, after natural decomposition of the soft tissues.

descaling), a situation which is valid both for the external and internal bone wall. The fragment does not present white coating, is not warped or deformed, and the fissures do not form a reticular pattern – characteristics that support burning in a dry state. The margins of the fragment are smooth, which suggests that the fracture of the bone wall occurred before burning and not during it. Generally speaking, the characteristics of this fragment indicate a weak, non-uniform and incomplete postmortem burning at low temperatures and for a short period of time, the bone being disarticulated at that time and dry (without muscle tissue or tegument, beyond the natural decomposition process, defleshed). Most probably, this cranial fragment was not burned *in situ*, but in a different location, the burning being either deliberate or accidental.

Figure 21. *Subject 8b, probably male, 20–30 years old: a. Tabula interna ossis cranii, charred diploë layer; b. Section trough the bone.*

Intentional human-made marks

Except for Skull 3 (to which we will refer in more detail in the sub-chapter *Cultural modifications*), on no other skeletal elements did we observe traces of slicing or scraping, chopping tool marks, impact/percussion marks, traces of polishing or abrasion, or cut marks from defleshing activities, regardless of whether they were articulated, semi-articulated or disarticulated remains. Correlating these observations with the break pattern, we can infer that, at the moment of manipulation and displacement from the primary context, the remains were no longer covered in organic tissue, but were in dry state. Because we are dealing with a deposition of mainly skulls, it is important to mention that there are no elements to support the theory of decapitation, and the absence of cervical vertebrae leads us to assume that these skulls, if they were the result of decapitation, were moved to the Skull Complex after the process of natural decomposition was complete.

The taphonomic picture of the Skull Complex is extremely intricate. The body parts did not decompose *in situ*. The natural process of decomposition of the soft tissues took place in a different place, most probably where the remains were first buried (and this process took place within the soil and not above it, in the open air). After decomposition, skeletal elements were taken out of the ground, manipulated, disarticulated and then deliberately moved and deposited, in a dry or almost dry state, in the Skull Complex, most probably all at the same time. We are dealing with postmortem manipulation of disarticulated (incomplete) skeletal parts, recombination of certain parts of the skeleton and their secondary inhumation in a hybrid burial. There is no indication of post-depositional manipulation.

CULTURAL MODIFICATIONS
(cutmarks, polish, and postmortem trepanation)

In our opinion, Skull 3 / Individual 10a (male, approximately 40 years old) suffered some cultural postmortem modifications, such as cutting, polishing and a posthumous trepanation. Some recent modification, produced after the removal of the skull from its context, during the first anthropological analysis of 1954 can also be noticed.

The skull is, in fact, a *calvaria* which resembles a concave bowl or a convex lid[27] (Pl. II/c-d). This "recipient" was reconstructed from three fragments and cleaned by O. Necrasov during the first analysis. The scaling procedure, performed with good intentions, in order to remove the calcareous layer (subaerial weathering) affected the colour of the bones and the texture of the bone walls, especially the external one. A careful analysis with the help of a binocular magnifying glass led us to assume that, after the reconstruction, the skull was treated with an acid solution, the traces of this being visible both on the exocranial wall and, especially, on the

[27] The maximum dimensions of this reconstructed cranial vault are: 189 mm in the sagittal plane and 140 mm in the transverse plane.

margins of the *calvaria*, more precisely on the cut and polished edges. We think that the margins of the piece were intentionally submerged in 1 cm of acid solution, in order to reveal cut and polish marks. Unfortunately, the acid solution removed not only the calcareous layer, but also 1-2 mm of the external and internal bone walls, which led to the loss of all traces, the removal of the stigmata resulting from the cutting and of the fine striations of abrasion/polishing (Fig. 22)[28]. What we can say with certainty is that the polished aspect is not the result of fluvial transport or subsurface sediment movements resulting from cryoturbation, but an alteration caused by an anthropic factor.

Figure 22. *Skull 3 / Subject 10a, male, ca. 40 years old, traces of cutting and polishing: a. Norma verticalis, tabula interna ossis cranii, cut and polished edges (arrows); b. Frontal, detail of the edges; c. Detail of the edges (magnified 20x) (photo by Monica Mărgărit).*

The fractures and fissures that led to the fragmentation of the skull (those visible with the naked eye) were produced postmortem, an observation that is valid also for the removal and polishing of the calotte. The margins are smooth, forming an approximate right angle with the surface of the bone. There is no bone reaction on the surface of the section, and the *diploë* layer is open. These characteristics suggest that the bone was relatively dry at the moment of the calotte removal. The calotte removal, which is the cutting or cropping of the cranial vault, was done quite carefully, on the same plane, probably with a sharp cutting object. The *diploë* layer, which has a considerable thickness (between 4 and 11 mm) is open (Fig. 22/b-c). After cutting, the margins of the piece suffered (intentional or accidental) ruptures in several places such as on the margin of the left parietal (in the area of temporal-parietal junction) and in the right lateral posterior part of the piece (in the posterior part of the right parietal and in the right part of the occipital). The margins without breaks have a rounded and blunt aspect, so that no margin of this piece remained sharp or cutting (Fig. 22). We do not exclude the possibility that this rounded and blunt aspect of the margins is also due to the immersion of the piece in acid, done in the 1950s for descaling purposes.

Besides the calotte removal and polishing, this piece presents another interesting characteristic – a cranial opening of approximately circular shape, located on the right parietal, near the coronal suture, to the extreme right side (Fig. 23/a-b). The cranial opening is complete, of the postmortem trepanation type[29]. Its dimensions are of approximately 24 mm in the transverse direction and 18

[28] Use-wear analysis performed by Monica Mărgărit and Andreea Vornicu.

[29] The instrumental removal of cranial vault sections is called trepanation (trephination). Motives inferred for this procedure in archaeological collections are necessarily speculative, ranging from therapeutic to

mm in the anterior-posterior direction, being located at approximately 50 mm from the *bregma* cranial point and at approximately 2 mm from the coronal suture. The margins of the opening are coarse and irregular, without regeneration signs. The *diploë* layer is barely distinguishable on the margins of the opening, without signs of regeneration (Fig. 23/b-c). There are no fissures starting from the margins. All these characteristics suggest that the intervention was performed postmortem, probably with the purpose of obtaining an amulet type rondel[30]. We cannot establish precisely the technique used to make this opening. However, we dare to suggest that it was percussion, in spite of the fact that the impact areas cannot be distinguished with clarity (it is possible that they also disappeared when the piece was immersed in acid)[31].

Figure 23. *Skull 3 / Subject 10a, male, ca. 40 years old, postmortem complete cranial opening: a. Norma verticalis, tabula interna ossis cranii, cranial opening on the right parietal (arrow); b. View of the cranial opening from the right norma lateralis; c. Detail of the anterior margin of the cranial opening (magnified 20x) (photo by Monica Mărgărit).*

The closest analogy for the 10a piece is a cranial fragment discovered by I. Nestor and E. Zaharia, in 1954, at the necropolis from Sărata Monteoru (Bronze Age, Monteoru culture) and analysed anthropologically by Necrasov *et alii* (1959, p. 14–16, 21–22). The piece (named *cranial fragment no. 71*) was discovered on a paved platform with a ritual destination, and is, in fact, a cranial fragment with an approximately circular contour, representing the posterior part of the neuro-skull (it includes the occipital and part of the parietals) (Fig. 24)[32]. The maximum dimensions of the piece are: 146 mm in the sagittal plane and 135 mm in the transverse plane. This

magico-ritual (Buikstra, Ubelaker 1994, p. 159). P. Broca (1875) distinguished between two forms of trepanation. One was "surgical trepanation", the type performed on the living in order to cure aftermaths of cranial fractures and wounds, headaches, mental retardation, brain tumors or other diseases (see also Ortner 2003, p. 171–172). The other was "postmortem trepanation", which was performed after death. The assumed goal of posthumous trepanation was the fabrication of cranial amulets and the rondels taken from sacred people, which probably played a protective role, conferring good luck (Wells 1964, p. 142; Lisowski 1967; Ortner 2003, p. 170; Finger, Clower 2003, p. 25, 27–28; Bennike 2003, p. 98; Breitwieser 2003, p. 150; Mednikova 2003, p. 167, 172; Murphy 2003, p. 213; Clifford Rose 2003, p. 355, 360). A third type, the so/called "symbolic trepanation" (pseudo-trepanation), was employed by a great number of peoples in Eastern Europe. In these cases, only the upper compact and the spongious parts are removed in a distinct spot of the *calvaria* without creating a connection between the endocranial space and the outer world (Jordanov *et alii* 1988; Bereczki, Marcsik 2005, p. 65, 68).

[30] For a review on skull rondels, see Georgieva, Russeva 2016.

[31] Use-wear analysis performed by Monica Mărgărit and Andreea Vornicu.

[32] The cranial fragment no. 71, discovered in 1954 at Sărata Monteoru, is presently part of the osteological collection of the "Olga Necrasov" Centre for Anthropological Research of the Romanian Academy – Iaşi branch.

fragment, in the shape of a cup, was cut out of the skull of a middle-aged male individual (between 30 and 50 years old).

Figure 24. *Skull no. 71 from Sărata Monteoru. Traces of cutting, polishing and partially healed trepanation.*

The cutting out was done postmortem, as indicated by the very fine striations that can be easily seen on the margins of the piece with the help of a magnifying glass. The *diploë* layer is open on all sides and has the same patina as the two bone layers (internal and external). The internal bone layer was destroyed (detached) in the anterior part of the left margin. This margin presents in its medial area two notches that could have resulted from an accident during the cutting.

The right margin of the piece presents an interesting characteristic – a partially healed trepanation. The trepanation of Skull no. 71 at Sărata Monteoru is located on the right parietal, in the medial part, immediately near the sagittal suture, going slightly over it. The cranial opening has two parts: a posterior part, with circular margin, located at 33 mm from the *lambda* cranial point, and an anterior rectangular part, with straight, slightly divergent and interrupted margin. The exact shape and the initial size of the trepanation could not be determined with certainty. The preserved dimensions of the cranial opening are: width of 28 mm in the circular area and 30 mm at the intersection of the margins with the circumference of the cranial fragment, length of 40 mm in the medial part and 36 mm on the lateral side. The medial margin (towards the sagittal suture) presents several small osteophytes and fine striations from the teeth of the instrument used for cutting. Trepanation was performed *intra vitam*. The patient survived for a while after the intervention. The regenerated margins and the completely regenerated *diploë* layer, closed by a healing osseous tissue support this assertion.

At the re-evaluation of the cranial fragment for the present study, it was noticed that the cut margins of the skull-cup were jagged. The surface of the cut lines was slightly rugged, forming a right angle with the bone surface. The bone was relatively dry at the moment of the calotte removal and polishing. Points of impact can be noted, polish is present on the percussion sides. Use-wear traces are visible on the inferior side, resulted from a process of friction (the area is characterized by macroscopic polish and fine striations). Use-wear traces appear also around the cranial opening, from the inferior side. Most certainly, the skull cup was intentionally modified and used[33].

Two Copper Age discoveries, north and south of the Danube, seem also to illustrate another two cases of skull-cups. One such artefact was discovered in Bulgaria, at Kozareva Mogila, in a Gumelniţa culture settlement layer. According to the description, Artefact F "is a big part of the skull vault …. comprising a nearly completely preserved frontal bone, a big part of the right parietal with destroyed areas of *margo squamosus* and *occipitalis*, and a fragment of the left side of the skull …….. A cut which extracted a part of the skull was performed on the left side of the skull vault, on the left side of the frontal bone, and on the left parietal about 1.5 cm from the sagittal suture and parallel to it. ….. The obtained fragment probably had an elliptic form; the preserved length of the cut is 15 cm. The edge of the cut is sharp, with no smoothing, the structure implies a manipulation on 'wet' bone, and the section shows no bone reaction. The manipulation was possibly performed shortly after the death of the individual when the bone was rich in collagen…." (Georgieva, Russeva 2016, p. 7). The skull from which the cup was made belonged to a male individual, with an age at death between 25/30 and 40/45 years (Georgieva, Russeva 2016, p. 7–8). At this time, there are no precise data on the context of discovery, since the unburned layer and the construction in which the fragment was found had not been excavated at the time the piece was published (Georgieva, Russeva 2016, p. 4).

The other Copper Age discovery was made north of the Danube, at Ostrovul Corbului – *Botul Cliuci*. It was reported as a chance discovery on the beach, while the researchers were investigating the prehistoric cemetery from the area (Fig. 25). The skull fragment was, in fact, a portion of a *calva* from the right side of the skull, with two thirds of the right orbit preserved towards the temple. It was considered improbable that the bone had broken in such a straight line, and an anthropic intervention was assumed. The margins of the fragment presented use-wear traces along the cut, the bone having a slightly

[33] Use-wear analysis performed by Monica Mărgărit.

rounded shape and a flattened aspect at the surface and in the area of the temporal bone, which could be due either to an anthropic intervention or to the action of the Danube's waters. The skull fragment belongs to a mature male individual (Miu *et alii* 2012, p. 54, fig. 10–13). At the moment of cutting, the bone was dry.

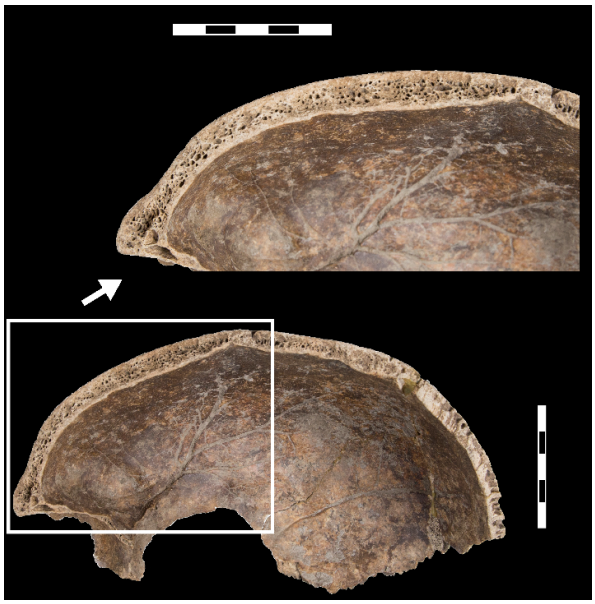

Figure 25. *Skull from Ostrovul Corbului. Traces of cutting and polishing (?) (photo C. Nicolae).*

Another possible analogy is that of two calottes removed from the skull above the eyebrow line, discovered in a hut (B_2/1994, Turdaş culture) at Orăştie – *Dealul Pemilor/X_2*. The author of the discovery interpreted them as possible drinking cups (Luca 2001, p. 49). Unfortunately, there is no detailed analysis of the bones, and the fact that in the monograph publication of the settlement, the bones are not mentioned (Luca 1997, p. 31) makes any interpretation by us quite impossible. The ^{14}C dates obtained seem strange at a first glance, given the large time span between two similar bones from the same archaeological feature[34]. But, comparing this situation with our case (in which there is also a significant difference between the dated bones), it seems that, at Orăştie, there is also a case of secondary manipulation of human remains in which bones were extracted from newer or older graves and modified by cutting at a later time in order to be used for some ritual activity.

Skull-cup artefacts were reported as early as the Upper Palaeolithic (Magdalenian) at Gough's Cave (Somerset, England), Le Placard (Charente, France) and Isturitz (Pyrénées-Atlantiques, France). The discovery from Gough's Cave illustrates the association of cannibalism and skull-cup production. The manufacturing of the cups was done on the fresh bone shortly after death, and after a meticulous removal of various muscle insertions and skin. All age groups were recorded in the analysed sample (Bello *et alii* 2011).

Another clear case of combination between cannibalism and skull cups is to be encountered at the Early Neolithic LBK site at Herxheim (Germany). In this case, massive deposition of disarticulated bones took place in pseudo-trenches. Most of the skull fragments were skull cups, with very few exceptions. It has also been determined that the cups were produced intentionally, from fresh bone, and that at the end of their treatment the human remains were quickly deposited in pits that were filled immediately afterwards (Boulestin, Coupey 2015, p. 115–116). Similar to the Upper Palaeolithic cases and different from ours, the edges of the skull cups from Herxheim were not straightened, retouched or polished, remaining rough (Boulestin, Coupey 2015, p. 85).

These analogies are important both from the perspective of the practice of making cups from skulls for various purposes, most probably ritual, but also for the analysis of the internal time-line of our feature, to which we will return later in this study.

DISCUSSION

The location of the feature

The Skull Complex is located in the northern part of the burial ground, in one of the two "ritual pits" (Fig. 2), as mentioned at the beginning of this paper. This location was not random. Many more features consisting of disarticulated human remains, accompanied by animal bones, pottery and other artefacts were discovered in the same area and were rarely reported in other parts of the cemetery.

The layout of the various component parts of the feature (Fig. 26)

Previously, we mentioned that the archaeological and biological reassessments were followed by the corroboration of the two sets of information. At this point, we are able to present the spatial distribution of the identified individuals according to their sex and age at death.

The skulls were laid out on two rows, approximately north-south, forming the letter "V", with the tip pointing south. The small cranial fragments and most of the postcranial fragments were located at the tip of the "V", at the end of the western row. The river stone was also

[34] The ^{14}C ages of these skulls (Luca 2001, Pl. VII-IX) are: skull 1 (Deb-5775) → 5790 ± 55 BP; skull 2 (Deb-5765) → 6070 ± 70 BP. Calibrations (95.5% probability) performed with OxCal v4.3.2 are: 4780–4517 cal BC (skull 1), 5211–4803 cal BC (skull 2).

located at the tip of the "V", but at the end of the eastern row. One question that is triggered by this arrangement is whether these two elements (the small cranial pieces and the stone) played the part of a complete *calvaria*.

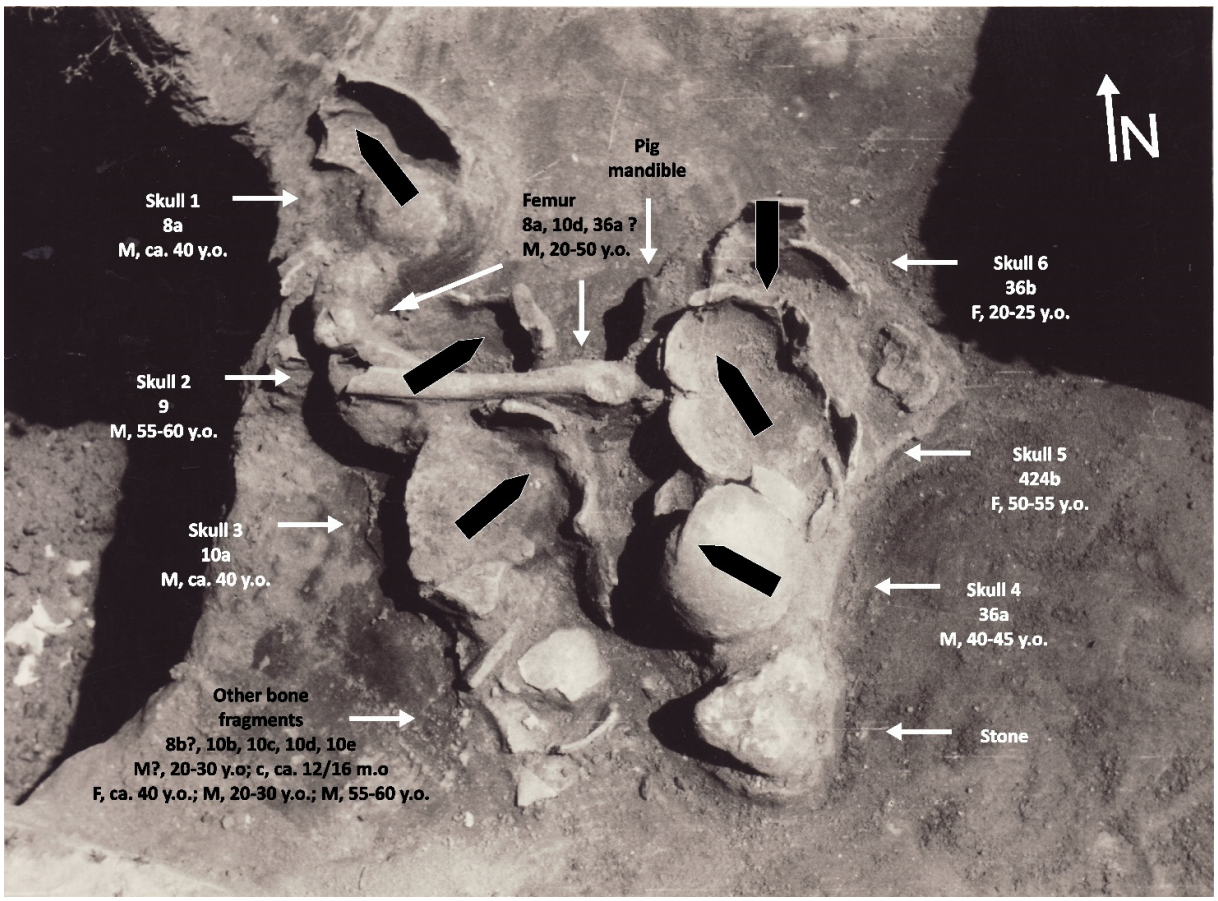

Figure 26. *The Skull Complex (archive photo) with the indication of the component parts correlated with the sex and age of the deceased and with the indication of skull's orientation (black arrows).*

All the skull caps were placed upside-down), except for Skull no. 4, placed in the normal upright position.

We suggest that the burned skull fragment (Individual 8b) was discovered in the area of Skull 1 (Individual 8a). Although several other similar cases of burnt bones (both human and animal) are known from this burial ground, reservations must be expressed concerning the affiliation of this fragment to the Skull Complex, mainly due to its atypical labelling (C.V. 8).

No special placement seems to have been given to the skull cup with trepanation (Skull 3/ Individual 10a).

The presence of the mussel shells and the animal jaw is a common element of many of the features with disarticulated human remains excavated at Cernavodă. Their significance is difficult to establish at this point. The mussel shells are not visible in the field photos but, according to the field notes (see Annex 1) they were freshwater mussel shells of small size, found both beneath Skull 3 and the boulder. This might suggest two lines of thought: either they were placed beneath the most particular/distinct element of each row, or they were placed exclusively in the southern half of the feature (towards the convergence of the two rows of skulls). Whether this placement is a deliberate one or just a coincidence is impossible to assess.

Sex and age representation (Fig. 26)

Most of the remains belonged to male subjects and only two (more or less complete) skulls belonged to women. Also, south of Skull 3, among a grouping of smaller bone fragments, the cranial remains from a third woman and a child were identified. No preference according to the age of the deceased could be established.

Orientation (Fig. 26)

Except for the two skull caps from the northern end of each line, the other four seem to suggest a deliberate orientation, facing towards the interior of the group, in a "V" opposed to that of the main layout. This situation seems to contradict Berciu's observation (Berciu 1954, p.

61–63) that there was no order in the orientation of the skulls.

Degree of intentionality

One aspect that is of paramount importance is the degree of intentionality behind this feature. The answer to the question "is this feature the result of an intention?" is three-fold:

- The deposition *per se* was clearly intentional, as well as the selection of the cranial parts; the cave calcitic concretion was also intentionally chosen to be part of the feature since it is not a type of stone that can be found lying around;

- The details of the deposition, such as the orientation of the skulls, the location of the larger stone and of the small cranial fragments and postcranial elements → their intentionality cannot be asserted with the same confidence, it can only be assumed with a greater or lesser degree of confidence; we may suppose some intention in placing the animal bone in the middle of the feature;

- The selection of the deposited remains in terms of sex and age of the deceased, their conscious arrangement according to the sex of the deceased (for example) → these would imply a knowledge, on the part of the authors of the deposition, of the deceased to whom the remains belong, which is very difficult if not impossible to prove.

As the question of intentionality is intrinsically connected to the question of the possible role of such a feature, we can only wonder about the function of the skull caps, of the skull cup with multiple postmortem interventions or of the remains of the individual who seems to be represented by more than a skull. For the moment, we cannot even formulate a hypothesis concerning this topic without descending into pointless speculation.

Time-line of the Skull Complex

Since the feature discussed here is the result of postmortem manipulation of human remains and secondary burial, the time-line of these actions is of utmost importance.

Without the radiocarbon dates, we would have been tempted to assume that the individual represented by the postcranial remains was the primary burial and was disturbed by the later deposition of skulls. However, the ^{14}C dates suggest a different time-line. One of the skulls was approximately 100 years older than the others, while the dated long bone was contemporaneous with one of the skulls that it could not possibly be associated with (the long bone and the skull could not be part of the same individual). On the one hand, this shows us that it is possible that the human remains were not from individuals that died at approximately the same time. Correlating this with the taphonomic observation that the bones demineralized in different places underground, we can assume that older graves were opened a while after decomposition of the bodies, and skulls (or other bones) were extracted and redeposited together almost immediately.

The manufacturing of the skull-cup also took place on dry bone, and it cannot be excluded that this happened between the exhumation of the skull and its reburial inside the discussed feature. This scenario would fit with the situation at Orăştie – *Dealul Pemilor* mentioned previously, where two skull-cups found in the same feature were dated a couple hundred years apart.

We still cannot explain the purpose/role of the postcranial remains in this assembly of skull fragments.

Close analogies

As intentionality is best proven by the identification of repetitions, we looked for analogies.

There is no case of secondary postmortem manipulation of human remains reported for the contemporary Hamangia culture cemetery at Durankulak (Todorova 2002).

We have, however, a similar report for the discoveries made at Cernavodă – *Coada Zăvoiului*, north of the *Columbia D* location, where Hamangia culture habitation remains and human bones were found: „*Close by, as well as further to the north, ritual depositions of human skulls were found, forming, in one case, a group of five, the others remaining isolated. Several human long bones as well as skulls of cattle, goat and pig maxilla were found together with the skulls.*" (Morintz *et alii* 1955, p. 158). Unfortunately, this feature was not recorded with the same accuracy, being excavated and the finds lifted mostly by soldiers working for the Army in the area.

Other depositions of large numbers of skulls, this time in settlement contexts, were reported for the Early Neolithic (Starčevo-Criş culture) sites at Cârcea – *Hanuri* and Cârcea – *Viaduct* (Romania), unfortunately without enough details to trigger a pertinent discussion (Kogălniceanu 2012b, p. 6–7, with bibliography).

Skull cult?

Such a feature inevitably raises the possibility of a skull cult. We adhere to the definition of Orschiedt that, in order to assume the existence of a skull cult, the discovery must fulfil two criteria simultaneously: a) it must be found in an existing "religious context" and b) the treatment(s) of the skull(s) must be repetitive, on multiple/different skulls (cited in Gresky *et alii* 2017, p. 3). In our case, while the first condition is clearly complied with, for the second we must finish the analysis of other features from the burial ground, since we could not find close analogies among contemporaneous and culturally equivalent cemeteries.

FINAL OBSERVATIONS

The structure of the Skull Complex (the relative abundance of a certain skeletal element – the skull – and the weak representation of the other elements) is not due to taphonomic factors or to animal interventions. It seems to be an intentional deposition, related to some funerary practices or, more probable, to a post-funerary process of manipulation of human remains, more precisely of certain isolated body parts, which indicates intent and well-organized selection.

The deposition of the complete body in the ground seems to be in this case a temporary and transitory stage of the funerary process, followed by exhumation, manipulation, and relocation (secondary burial) of certain skeletal elements based on certain criteria. In the cases of 10 individuals, the funerary practice indicated primary inhumation, exhumation, removal of the complete skull or only of parts of it, and reburial/relocation of these parts. Possibly, in the case of only one individual (male, 20–50 years old – Individual 10d or 36a), this ritual was not applied.

It is obvious that the secondary manipulation process focused on the selection of a particular skeletal element – the skull, irrespective of the sex or age of the deceased. The sub-adults and older adults are not missing from the demographic set of the Skull Complex, indicating that the selection did not exclude the inactive members of the community.

This particular burial ground is characterized by primary inhumations, but also by numerous features that yielded a large number of disarticulated human remains. Although we have no other reference to features similar to the one analysed here, the future analysis of the other depositions of disarticulated human remains may shed some light on the possible interpretations of this practice of secondary manipulation of the dead.

WAS IT WORTH IT?

There is always the question whether such an endeavour is worth the effort when compared to the apparently meagre results obtained.

It is the belief of the present authors that, despite a much larger time expenditure compared to that of the analysis of a freshly excavated context, such attempts are not only worth it, but necessary. Our argument is that, since so many important sites were extensively excavated and remained unpublished for a long time, while there still is enough data, it is significant to try and (re)analyse the past finds and publish them. An adequate financial support would undoubtedly generate more numerous and rewarding results.

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Plate I. *Skull 1 / Subject 8a, male, ca. 40 years old: a. Norma frontalis; b. Norma lateralis (left); c. Norma occipitalis; d. Norma verticalis; e. Incomplete temporal.*

Plate II. *Postmortem accidental or intentional changes. a–b. Subject 8b, probable male, 20–30 years old: burning traces, viewed from the outer (left) and inner (right) surface of the skull; c–d. Skull 2 / Subject 9, male, 55–60 years old: skull-cup with postmortem cranial opening, viewed from outer (left) and inner (right) surface of the skull.*

Plate III. *Skull 2 / Subject 9, male, 55–60 years old: a. Norma frontalis; b. Norma occipitalis; c. Norma lateralis (left); d. Norma verticalis.*

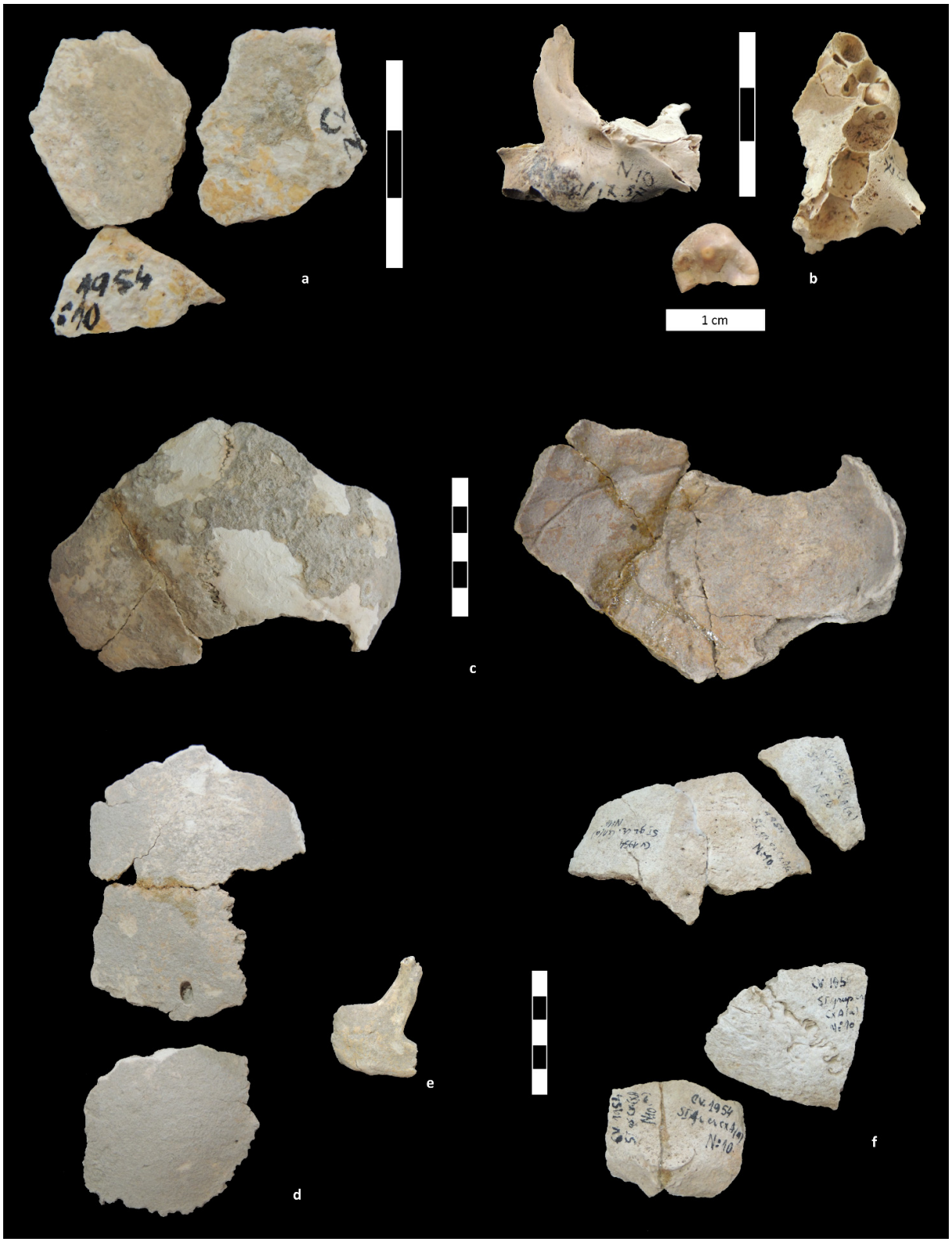


Plate IV. *Poorly represented skulls. Subject 10b, infant, 12–16 month: fragments from the parietals (a) and from the left maxilla (b); Subject 10c, probably female, ca. 40 years old: cranial fragments viewed from the outer (left) and inner (right) surface of the skull (c); Subject 10d, probably male, 20–30 years old: cranial fragments (d); left zygomatic (e); Subject 10e, probably male, 55–60 years old: cranial fragments (f).*

Plate V. *Skull 4 / Subject 36a, male, 40–45 years old: a. Norma frontalis; b. Norma lateralis (left); c. Norma occipitalis; d. Norma verticalis.*

Plate VI. *Skull 5 / Subject 424b, female, 50–55 years old: a. Norma frontalis; b. Norma lateralis (left); c. Norma occipitalis; d. Norma verticalis.*

Plate VII. *Skull 6 / Subject 36b, female, 20–25 years old: a. Norma frontalis; b. Norma verticalis; c. Norma lateralis (left); d. Incomplete left temporal.*

Plate VIII. *Osteological remains with uncertain attribution (I): a. Fragment from the right mandibular body, viewed from the internal (left) and external (right) surface; b. Isolated teeth, from the left to the right: a lower left first or second premolar, an upper left second molar, and an upper left second premolar; c. Cranial fragments; d. Right clavicle, medial fragment; e. Left clavicle, medial fragment.*

Plate IX. *Osteological remains with uncertain attribution (II): a. Right humerus, proximal third of the diaphysis; b. Right humerus, meta-diaphyseal distal fragment; c. Left humerus, proximal third; d. Left humerus, medial fragment from the diaphysis; e. Left radius, medial and distal thirds; f. Fragments from the proximal thirds of radii; g. Right ulna, proximal meta-diaphyseal fragment; h. T11 thoracic vertebra; i. Left tibia, fragment from the diaphysis; j. Left coxal fragment; k. Right femur, meta-epiphyseal proximal fragment; l. First metatarsal.*

ANNEX 1: The mentions and description of the Skull Complex in the field notes

Description 1 (Morintz 1954, Luni, 17 mai):

În Ş I (/1954) …. În □ 6 între cca. -40 -50 cm un complex de 5 cranii omeneşti.

In Trench S I (/1954) .... In sq. 6, between approximately -40 -50 cm a feature composed of 5 human skulls.

Description 2 (Morintz 1954, Vineri, 28 mai):

Astăzi s-a trecut în plan complexul celor 5 capete din S I □ 7 la -35 -53 cm. S-au făcut şi observaţii sumare.

Today the feature of the 5 skulls from S I, sq. 7, -35 -53 cm was drawn. Brief observations were also made.

Description 3 (Morintz 1954, 9 iunie):

..... în □ 6–7 complexul craniilor.

..... in sq. 6–7 the feature with skulls.

Description 4 (Berciu 1954, Miercuri, 19.V.54):

Într-un singur caz mi se spune că se află 5 cranii aşezate la un loc într-o oarecare regulă. Se vor dezveli cu grijă mâine.

In only one case I was told that 5 skulls were placed together in some kind of order. They will be excavated with care tomorrow.

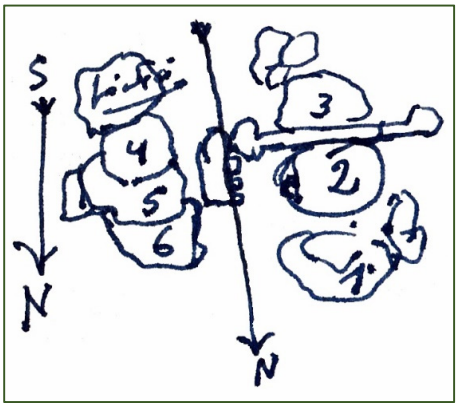
Description 5 (Berciu 1954 (Vineri, 4.VI.54):

Descrierea grupei de cranii din Ş.I. Cele 6 cranii se găsesc grupate la un loc, având un femur deasupra craniului nr. 2. Femurul este rupt din vechi, din cauza greutăţii pământului. În parte, femurul trece printre craniile 2 şi 3 şi ajunge cu un capăt la falca de animal (singura vizibilă acum), care se găseşte la mijlocul grupei de cranii. Spre stânga ei (privind dinspre N, de unde eu fac descrierea) se află craniul 5.

The description of the group of skulls from S.I. The 6 skulls are grouped in the same place, having a femur on top of skull no. 2. The femur was broken in the past due to the weight of the earth. The femur passes partially between skulls 2 and 3 and with the other end reaches the animal jaw (the only one visible at this point), located in the middle of the group of skulls. Skull 5 is located to its left (looking from the N, from where I'm doing the description).

Craniile sunt grupate în două şiruri, astfel:

The skulls are grouped on two rows, as illustrated:



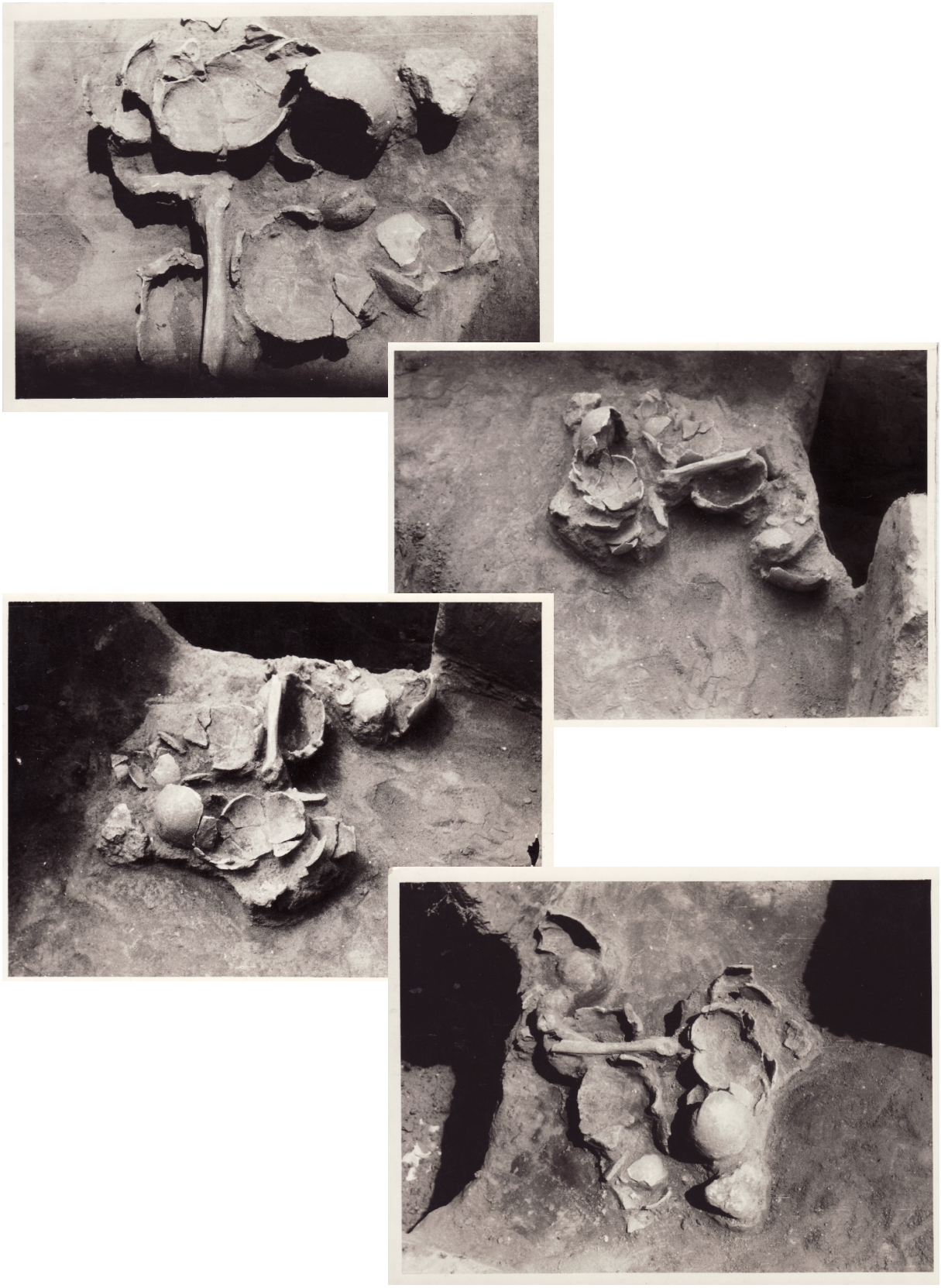
Orientare N-S (prin cărarea dintre cele două grupe de cranii). Orientarea este corect N-S printre cele două grupe. Craniul nr. 1 se află spre Vest, căzut pe partea dreaptă, cu ochii spre Sud. E vorba de calva. Aceeaşi situaţie este la toate „craniile" de aici. Nu văd deocamdată, pe cât s-a dezvelit, nicio mandibulă. De la craniul 2 până la 1 (în linie dreaptă) este o distanţă de 0,25 m. Sub fragmentul mare (calva) se află alte fragmente mai mici. Nu se observă nici o urmă de violenţă. Nr. 1 a fost aşezat pe pământul galben-ciocolatiu. Nu se găsea nimic sub el. Între Nr. 1 şi Nr. 2 se află şi un fragment de tibia (?).

Orientation N-S (through the path in-between the two groups of skulls). Orientation is correct through the two groups. Skull no. 1 is to the west, fallen on the right side, with eyes to the south. It's a calva. The same applies for all the "skulls" here. I don't see for the moment any jaw. From skull 2 to 1 (in straight line) there is a distance of 0.25 m. Beneath the big fragment (calva) there are other smaller fragments. No trace of violence is visible. No. 1 was placed on the yellow-brownish soil. There was nothing beneath it. In-between no. 1 and no. 2 there is a fragment of tibia (?).

Falca de porc se împachetează cu nr. 2. E un fragment de falcă. Dar în mod constant se pun atari fălci de porc lângă morţi. Nr. 1 este aşezat cu creştetul pe solul galben-ciocolatiu, la acelaşi nivel cu nr. 2. Orbitele sunt la Est. Nu are urme de violenţă. Lipseşte şi aici maxilarul inferior. Nici un dinte din cel superior. Deci tot o calvaria. Nr. 3 a fost aşezat lângă 2, tot pe acelaşi pământ. Orbitele spre Est. Tare sfărâmat. Sub el, prin sol, grupate mici cochilii de scoici. Nr. 4: aşezat la acelaşi nivel, pe baza craniului, cu orbitele spre Vest. Deci nu este o regulă în aşezarea craniilor. La Sud se află o piatră neregulată aşezată însă intenţionat lângă cranii. Piatra: lg 12,5 cm, lată 11 cm şi groasă 5 cm. Nr. 5 aşezat spre N de 4, alături de el, dar ceva mai sus. Aşezat pe creştet, cu orbitele spre NV. Pare fragmentar. Nr. 6 în stare fragmentară, chiar calvaria. Printre fragmente s-a găsit şi un mic fragment din maxilarul superior. Nici un obiect în grupa craniilor.

The pig jaw is packed with no. 2. It's a jaw fragment. Such pig jaws are constantly placed near the deceased. No. 1 is placed with the top of the head on the yellow-brownish soil, at the same level with no. 2. Eye sockets to the east. No traces of violence. The lower jaw is missing here also. No tooth from the upper jaw. Again, a calvaria. No. 3 was placed near no. 2, on the same soil. Eye sockets to the east. very fragmented. Beneath it, in the soil, a group of small mussel shells. No. 4: placed at the same level, on the base of the skull, with eye sockets to the west. The stone: length 12.5 cm, width 11 cm, thickness 5 cm. No. 5 placed towards the north of no. 4, near it, but slightly upper. Placed on the top of the skull, with eye sockets to the northwest. Looks fragmentary. No. 6, fragmentary, even calvaria. among the fragments there was a small fragment of the upper jaw. No object in the group of skulls.

ANNEX 2: Archive photos of the Skull Complex



ANNEX 3: The paleo-anthropological description of the bones from the Skull Complex as made in the manuscript of the Contract no. 134/1981, vol. 1 (Necrasov *et alii* 1981, p. 21–23, 35)

Grupa craniilor din complexul A: cuprinde resturile osoase a unui număr destul de mare de schelete extrem de fragmentare. Printre ele distingem următoarele:

Scheletul nr. 8 (Col.D, S.I, groapa Cx A) este reprezentat numai printr-un neurocraniu incomplet şi un fragment de cubitus. El a aparţinut unui barbat de circa 40 ani. Indicele cefalic este hiperdolicocran (66.50), fruntea este eurimetopă (70.80) destul de oblică şi cu crestele de tip intermediar. Forma craniului în normă verticală este brizoid alungită şi de "casă" în norma occipitală. Curba sagitală prezintă o frunte înclinată, o linie a creştetului lungă şi ascendentă, un occipital bombat prezentând deasupra sa o aplatizare prelambdică destul de accentuată. Bolta craniană este ridicată în regiunea sagitală dând un aspect ogival conturului cranian, văzut din faţă. Relieful glabelar (IV–V) cât şi cel supraciliar (2) sunt destul de puternice. Relieful occipital este din contra slab dezvoltat, dar trebuie să subliniem prezenţa unei uşoare afundături deasupra inionului în formă de cupulă. Prin relieful supraorbitar şi prin forma generală înclinată a frunţii această calotă se apropie într-o oarecare măsură de craniul Prezdmost III.

Scheletul nr. 9 (Col.D, s.I, groapa com. Cx A), nu prezintă decât un fragment de neurocraniu. El a aparţinut unui bărbat de 55–60 ani. Cu toată lungimea sa foarte apreciabilă şi dat fiind lărgimea sa relativ mare, indicele său cefalic este mezocran (76.02). Indicii vertico-longitudinal şi vertico-transversal îl situează în categoria ortocrană (59.39) şi tapeinocrană (78.52). Forma craniului, văzut de sus este cea brizoidă-romboidă şi de „casă" în norma occipitală. Curba sagitală indică o frunte slab înclinată, aproape dreaptă, o linie a creştetului destul de lungă şi slab ascendentă, un occipital bombat. Fruntea este stenometopă la limita cu categoria metriometopă (65.33) şi prezintă o dispoziţie intermediară a crestelor. Relieful glabelar este puternic (IV–V) ca şi cel supraciliar (2–3). Relieful occipital este însă atenuat. Relieful supramastoidian este foarte pronunţat. Rădăcina oaselor nazale indică o carenă proeminentă a nasului şi o rădăcină profundă. Prin relieful frontal acest craniu prezintă unele afinităţi Przedmost.

Scheletul nr. 10 a (Col.D, s.I, groapa com. Cx A) este reprezentat doar prin un fragment mare de neurocraniu corespunzând părţii superioare şi medială a frontalului, părţilor mediane ale celor două parietale precum şi partea superioară a occipitalului. Această piesă, reconstituită din 3 fragmente se prezintă ca o calotă convexo-concavă, în formă de capac, cu marginile pe alocuri drepte şi ceea ce pare a fi cel mai interesant este faptul că marginile ei se prezintă regulat tăiate, ca şi cum ar fi fost ferăstruite pe un craniu (sau cap) proaspăt, în scopul de a forma o cupă largă, ale cărei margini au fost rupte ulterior, în toată regiunea laterală stângă a circumferinţei sale, precum şi în regiunea postero-laterală dreaptă. Deasemeni, în dreptul părţii posterioare a suturii sagitale drepte, se observă o soluţie de continuitate care ar putea reprezenta fie o leziune patologică, fie o trepanaţie. Această piesă craniană prezintă analogii interesante cu o piesă gasită la Sărata Monteoru în 1954 (P 7 – 1) de Prof I. Nestor şi predată nouă pentru studiu.

Această piesă a aparţinut cu mare probabilitate unui bărbat de peste 40 de ani. Craniul din care făcea parte prezenta dimensiuni mari şi era probabil mezocran.

În acelaşi complex şi în vecinătatea piesei 10 a, au mai fost găsite şi resturile altor 2 cranii: unul este de copil (scheletul nr. 10 b), iar altul probabil de femeie (scheletul nr. 10 c). Tot acolo au fost găsite şi câteva fragmente de oase lungi (humerus, radius, femur, tibie, metatarsul I). Dintre toate acestea, cele mai interesante sunt jumătatea proximală a unui humerus stâng, prezentând un puternic relief muscular şi o parte din diafiza unei tibii stângi de tip platicnemic.

Scheletul nr. 36 a (S I grupa craniilor 4 şi 6) este reprezentat numai prin o calotă extrem de fragmentară, care a aparţinut cu oarecare probabilitate unui bărbat matur în vârstă de circa 40–45 ani – apreciind după curbura parietalelor craniul era ori foarte moderat dolicocran ori mezocran. Remarcăm prezenţa pe occipital, în regiunea suprainiacă a unui şanţ transversal, puţin adânc.

Scheletul nr. 36 b (S I grupa craniilor 4 şi 6) este reprezentat prin o calota şi mai fragmentară decât cea precedentă. Se poate doar aprecia că ea a aparţinut unei femei adulte de cel mult 25 ani.

The group of skulls from Feature A: includes the osteological remains of a quite large number of extremely fragmented skeletons. Among them, we identify the following:

Skeleton no. 8 (Col.D, D.I, pit Cx A) is represented only by a fragmentary neurocranium and by a cubitus fragment. They belonged to a man of approximately 40 years. The cephalic index is hyperdolichocephalic (66.50), the forehead shows eurymetopy (70.80), quite oblique and with intermediary type crests. The shape of the skull in vertical norm is prolonged brysoid and in occipital norm is of "house" type. The sagittal curve presents an inclined forehead, with a long and ascendant line of the crown, a bulged occipital with a quite accentuated prelambdic depression. The cranial vault is raised in the sagittal area giving an ogival aspect to the contour of the skull viewed frontally. The glabellar relief (IV–V) and the supraorbital ridge (2) are quite strong. On the other hand, the occipital relief is weak, but we must highlight the presence of a slight deepening above the inion of cupula shape. With its supraorbital ridge and with its general inclined shape of the forehead, this calotte resembles to some degree the Prezdmost III skull.

Skeleton no. 9 (Col.D, s.I, comm. pit Cx A), is represented only by a neurocranial fragment. It belonged to a man of about 55–60 years. With all its impressive length and quite big width, the cephalic index is mesocephalic (76.02). The vertical-longitudinal and vertical-transversal indices place it in the orthocranial (59.39) and tapeinocranial (78.52) groups. The shape of the skull seen from above is brisoid-rhomboid and seen from the occipital is of "house". The sagittal curve indicates a weakly inclined forehead, almost straight, a quite long and weakly ascendant line of the crown, a bulged occipital. The forehead is stenometopic at the limit with metriometopic group (65.33) and presents an intermediary disposition of the crests. The glabellar relief is strong (IV–V) as well as the supraciliary one (2–3). The occipital relief is attenuated. The supramastoidian relief is very well pronounced. The root of the nasal bones indicates a prominent hull of the nose and a deep root. With its frontal relief, this skull presents some affinities with the Przedmost skull.

Skeleton no. 10 a (Col. D, s.I, comm. pit Cx A) is represented only by a large fragment of the neurocranium corresponding to the upper and median part of the frontal bone, median parts of the two parietal bones as well as the superior part of the occipital bone. This piece, reconstructed of 3 fragments presents itself as a lid-shaped convexo-concave calotte, with some of the margins straight and, what is more interesting is that its margins appear regularly cut, as if cut with a saw from a fresh skull (or head) with the purpose of obtaining a large cup whose margins were consequently broken on the entire left side of its circumference as well as in the right postero-lateral area. Also, in the posterior area of the sagittal suture a continuity solution can be noticed which could represent either a pathologic lesion or a trephination. This cranial piece presents interesting analogies with another piece found at Sărata Monteoru in 1954 (P 7 – 1) by Prof. I. Nestor and given to us for study.

This piece belonged most probably to a man over 40 years. The skull it belonged to was large sized and probably mesocephalic.

In the same feature and in the vicinity of piece 10 a, the remains of other 2 skulls were found: one belonged to a child (skeleton no. 10 b), and the other one probably to a woman (skeleton no. 10 c). Several long bone fragments were also found there (humerus, radius, tibia, first metatarsal). Of all these, the most interesting are the proximal half of a left humerus with a strong muscle relief and a part from the diaphysis of a left tibia of platycnemic type.

Skeleton no. 36 a (S I the group of skulls 4 and 6) is represented only by an extremely fragmentary calotte which belonged with some probability to a mature man of 40–45 years – estimating based on the curvature of the parietal bones, the skull was either moderate dolichocephalic or mesocephalic. We note the presence on the occipital bone of a shallow suprainiac depression.

Skeleton no. 36 b (S I the group of skulls 4 and 6) is represented by an even more fragmented calotte than the previous one. It can only be estimated that it belonged to an adult woman of maximum 25 years.

ANNEX 4: Situation of the labels found with the bones and markings found on the bones

Anthropological ID	Observations	Location of discovery indicated in the anthropological contract	Original archaeological label	Markings on the bone
Skeleton no. 8	- for ID 8 a burned fragment of a skull, named by us ID 8b	Group of skulls from Complex A Col.D, S.I, pit Cx A	Cern 54, Col. D, S I, from the group of skulls, complex A	- on the exterior of the skull, marked "Cv 54, No. 8", with black ink, on the frontal bone - on the interior of the skull, marked with chemical pencil, a "1" - on the exterior of the burned fragment, marked with black ink "C.V. 8"
Skeleton no. 9		Col.D, s.I, com. pit, Cx A	Cern 1954, Col. d, S I, group of skulls, complex A	- on the exterior of the skull, on the frontal bone, marked with black ink "Cv. 54, Col. D, S I, Complex a, No. 9" - on the interior of the skull, marked with chemical pencil, a "2"
Skeleton no. 10 (a, b and c)	- from the group marked with "10", two more individuals were separated by us (d and e)	Col.D, s.I, com. pit, Cx A	Cern 54, Col. D, S I, from the skulls grouped in complex A	- on the exterior of skull 10a, on the frontal bone, with black ink, "Cv. 1954, Nr. 10" - on the fragments from 10b, with ink, "…….. 61, R. 57, N.10" (on the mandible fragment) or "CV 54, no. 10" (on other small skull fragments) - fragment 10c without markings - fragments 10d without markings - fragments 10e, marked with ink, "Cv. 1954, S I, gr. cr. CxA(a), No. 10" - long bones from group "10", marked with black ink "CV. 1954, S I, gr. cr. CxA(a), No. 10" - one tooth, unmarked
Skeleton no. 36 (a and b)		S I group of skulls 4 and 6	Cernavoda 1954, Columbia D, S I, the Group of skulls no. 4 şi 6	- on the exterior of skulls 36a and 36b, on the frontal bone, with black ink, a modified marking "~~Cv. 54, No. 39~~ or Cv 54 Gr. cr. 4+6, ~~No. 39~~ / Cv 954, No. 36" (on the exterior of another fragment, with blue ink?, "No. 39", unmodified) - vertebra from "36" unmarked - basin fragment from "36", marked only with "36", unmodified - two teeth, unmarked
ID 424b	- one fragment from the bag with ID 424b could be refitted with ID 36a	It was not analyzed by the Iaşi team together with the other remains; it was identified among the pottery packages in the deposit at Bucharest	Cernavoda Col D, ş. I, the Group of skulls, Skull no. 5	- recently restored skull, only some of the fragments marked on the inside "Cvd 55, Col D, S I, Cr. 5" - with the chemical pencil, on the inside, a "5"

ANNEX 5: The structure of the osteological sample from the Skull Complex

Archaeological No.	Anthropological No. (1950's)	Anthropological No. (present study)	Representation state	Sex	Age at death
Skull 1	8	8a	calvaria (including temporals)	male	ca. 40 years old
?	?	8b	fragment from the left parietal (burned)	probably male	20–30 years old
Skull 2	9	9	calvaria (including the left temporal)	male	55–60 years old
Skull 3	10a	10a	calvaria with cut and polished edges (parts from the frontal, parietals and occipital)	male	ca. 40 years old
?	10b	10b	left upper maxilla, fragments from parietals	undetermined	12–16 months old ± 4 month
?	10c	10c	fragments from frontal and right parietal	probably female	ca. 40 years old
?	?	10d	left zygomatic, fragments from frontal and left parietal	probably male	20–30 years old
?	?	10e	fragments from parietals and occipital	probably male	55–60 years old
Skull 4	36a	36a	calvaria	male	40–45 years old
Skull 6	36b	36b	fragments from frontal, parietals and left temporal	female	20–25 years old
Skull 5	?	424b	calvaria	female	50–55 years old
34 fragments with uncertain attribution (8a or 10d, or 36a)			fragments from: - right mandibular body - isolated teeth (lower left first or second premolar, upper left second premolar, upper left second molar) - 11 cranial small fragments - T11 thoracic vertebra - clavicles (left and right) - humeri (left and right) - radii (left and right) - left coxal - right femur - left tibia - first metatarsal - 3 postcranial small fragments	probably male	20–50 years old

ANNEX 6: Metrical data

Martin No.	Absolute and relative values						
		Skull 1 Individual 8a	Skull 2 Individual 9	Skull 3 Individual 10a	Skull 4 Individual 36a	Skull 5 Individual 424b	Skull 6 Individual 36b
1.	Maximum cranial length(*g-op*)	203	196	-	-	176	-
2.	*Glabella-inion* length(*g-i*)	197	-	-	-	172	-
3.	*Glabella-lambda* length (*g-l*)	194	190	-	-	170	-
8.	Maximum cranial breadth (*eu-eu*)	135	150	-	146	-	-
9.	Minimum frontal breadth (*ft-ft*)	97	98	-	-	110	-
10.	Maximum frontal breadth (*co-co*)	112	114?	-	121	-	-
12.	Maximum occipital breadth (*ast-ast*)	-	-	-	106	-	-
20.	Maximum cranial height (*po-b*)	-	117	-	-	-	-
26.	Frontal arch (*n-b*)	127	134	-	-	123	-
27.	Parietal arch (*b-l*)	138	129	150	126	115	132
28_1.	Upper arch of the occipital (*l-i*)	78	-	-	55	50	-
29.	Frontal chord (*n-b*)	112	116	-	-	108	-
30.	Parietal chord (*b-l*)	120	115	129	116	100	114
31_1.	Upper occipital chord (*l-i*)	71	-	-	51.5	49	-
43.	Upper facial breadth (*fmt-fmt*)	-	-	-	-	106	-
43_1.	Internal biorbital breadth (*fmo-fmo*)	-	-	-	-	96	-
8:1	Cranial index	66.50	76.02	-	-	-	-
20:1	Vertical-longitudinal index	-	59.39	-	-	-	-
20:8	Vertical-transversal index	-	78.52	-	-	-	-
9:10	Frontal-transversal index	86.61	85.96	-	-	-	-
9:8	Frontal-parietal transversal index	70.80	65.33	-	-	-	-
12:8	Parietal-occipital transversal index	-	-	-	72.6	-	-
27:26	Frontal-parietal sagittal index	108.66	96.27	-	-	93.49	-
29:26	Frontal curvature index	88.19	86.57	-	-	87.80	-
30:27	Parietal curvature index	86.96	89.15	86.0	92.06	86.96	86.36
31_1:28_1	Upper occipital curvature index	91.03	-	-	93.6	98.0	-
9:43	Frontal-parietal index	-	-	-	-	103.8	-

Table 2. *Absolute (in mm) and relative (indices) values of the cranial skeleton.*

	Martin No.	Absolute and relative values	
Humerus, left	5.	Maximum diameter at midshaft	26
	6.	Minimum diameter at midshaft	21
	10.	Vertical diameter of head	49
	6:5	Section index	80.77
Humerus, right	5.	Maximum diameter at midshaft	25
	6.	Minimum diameter at midshaft	20
	6:5	Section index	80.00
Radius, left	4.	Transverse diameter at midshaft	17
	5.	Anterior-posterior diameter at midshaft	15
	5:4	Section index	88.23
Coxal, left (ischium)	16.	Ischium length	93
Femur, right	19.	Maximum antero-posterior head diameter	49
Tibia, left	8.	Anterior-posterior diameter at midshaft	33
	9.	Transverse diameter at midshaft	19.5
	9:8	Section index	59.09
First metatarsal, right	1	Maximum metatarsal length	68
	1a	Biomechanical (articular) length	64
	3	Midshaft breadth	13
	4	Midshaft height	14

Table 3. *Absolute (in mm) and relative (indices) values of the postcranial bone fragments with uncertain attribution.*

ANNEX 7: Synthetic view on the presence or absence of bones from the sample

	Remains mentioned by the archaeologists (Annex 1, Description 5)		Remains analysed by the anthropologists in the 50s and mentioned in the anthropological recording form or in the manuscript)		Remains preserved until today and analysed in the present study (including the labelling)	
	Reporting	**Location**	**Mentioning**	**Attribution**	**Presence**	**Marking**
Right mandibular body	-	-	-	-	X	10
Upper maxilla	X (fragment, field notes)	Skull 6 (36b)	-	-	-	-
Lower left first or second premolar	-	-	-	-	X	-
Upper left second premolar	-	-	-	-	X	-
Upper left second molar	-	-	-	-	X	-
T11 thoracic vertebra	-	-	-	-	X	-
Clavicles	-	-	-	-	X (left, medial)	10
					X (right, proximal and medial)	10
Humeri	-	-	X (manuscript)	10 (manuscript)	X (left, proximal and medial)	10
					X (right, proximal and distal)	10
Radii	-	-	X (manuscript)	10 (manuscript)	X (left, proximal, medial and distal)	10
					X (right, proximal)	10
Right ulna	-	-	X (manuscript)	8a	X (right, proximal)	-
Left coxal	-	-	-	-	X	36
Femur	X (complete, field notes and photos)	between Skulls 2 and 3 (= 9, 10a)	X (manuscript, recording form)	10c (manuscript, recording form)	X[35] right (proximal)	10
			X[36] (adolescent, recording form)	36b	-	-
Tibia	X (field notes)	between Skull 1 and 2 (8a, 9)	X (manuscript)	10 (manuscript)	X left (medial)	10
First metatarsal bone	-	-	X (manuscript)	10 (manuscript	X (right)	10

[35] The femur fragment analyzed by us does not seem to correspond with that from the field photo; it could be different fragments.

[36] A particular situation applies also to a femur fragment from an adolescent individual. The bone is mentioned only by the anthropologists and only on the anthropological evidence sheet of the subject ”36b”; it was not mentioned in any publication and it was also not mentioned in the old anthropological report.

ANNEX 8: Minimal number of individuals

	Sub-adults	Adults	Total
Cranial skeleton			
Frontal	-	8	8
Left parietal	1	9	10
Right parietal	1	8	9
Occipital	-	6	6
Left temporal	-	3	3
Right temporal	-	1	1
Left nasal	-	1	1
Right nasal	-	1	1
Sphenoid	-	1	1
Left maxilla	1	-	1
Left zygomatic	-	1	1
Left mandibular body	-	1	1
Postcranial skeleton			
T11 thoracic vertebra	-	1	1
Left clavicle (medial)	-	1	1
Right clavicle (proximal and medial)	-	1	1
Left humerus (medial)	-	1	1
Right humerus (proximal and distal)	-	1	1
Left radius (proximal, medial and distal)	-	1	1
Right radius (proximal)	-	1	1
Right ulna (proximal)	-	1	1
Left coxal	-	1	1
Right femur (proximal)	-	1	1
Left tibia (medial)	-	1	1
First right metatarsal	-	1	1
Dentition			
Lower left first or second premolar	-	1	1
Upper left second premolar	-	1	1
Upper left second molar	-	1	1
Number of elements	3	55	58

ANNEX 9: Present day state of the osteological material

Subjects	**Preservation state**	**Representation state** (in %)	**Articulation** (yes or no)	**Subaerial weathering** (Buikstra, Ubelaker 1994)	***Postmortem* brakes**
Skull 1 / Individual 8a	satisfactory	25–75%	Yes (except temporals, sphenoid and one fragment from the occipital)	weathering, 3rd degree	old and new
Subject 8b	satisfactory to poor	< 25%	No	weathering, 3rd degree	old and new
Skull 2 / Individual 9	good	25–75%	Yes	weathering, from 1st to 3rd degree	old and new
Skull 3 / Individual 10a	satisfactory	25-75%	Yes	cutmarks, polish, weathering (3rd degree), and discoloration	old
Individual 10b	satisfactory	< 25%	No	weathering, 2nd degree	old and new
Individual 10c	satisfactory	< 25%	Yes	weathering, 2nd degree	old and new
Individual 10d	satisfactory	< 25%	Yes (except the left zygomatic and the posterior part of the left parietal)	weathering, from 2nd to 3rd degree	old and new
Individual 10e	satisfactory	< 25%	No	weathering, 2nd degree	old and new
Skull 4 / Individual 36a	satisfactory	25–75%	Yes	weathering, 3rd degree	old and new
Skull 5 / Individual 424b	good	25–75%	Yes	weathering, from 1st to 2nd degree	old and new
Skull 6 / Individual 36b	satisfactory	25–75%	Yes (except the left temporal)	weathering, from 2nd to 3rd degree	old and new
Uncertain assigned remains (cranial and postcranial)	satisfactory to good	25–75%	No	weathering, from 1st to 3rd degree	old and new

ABRÉVIATIONS / ABBREVIATIONS / ABREVIERI

AA – Archäologischer Anzeiger. Deutsches Archäologisches Institut, Darmstadt, München, Tübingen–Berlin
ACMI – Anuarul Comisiunii Monumentelor Istorice, Bucureşti
ActaMN – Acta Musei Napocensis, Cluj
ActaMP – Acta Musei Porolissensis, Zalău
ActaTS – Acta Terrae Septemcastrensis, Universitatea Lucian Blaga, Sibiu
Acta Siculica – Acta Siculica. Anuarul Muzeului Naţional Secuiesc, Sfântu Gheorghe
l'Anthropologie (Paris) – l'Anthropologie, Paris
Antiquity – Antiquity. A Quarterly Review of Archaeology, University of York
Anuarul MJIAP – Anuarul Muzeului Județean de Istorie și Arheologie Prahova, Ploiești
ARA – Annuaire Roumain d'Anthropologie
Archaeometry – Archaeometry, Research Laboratory for Archaeology and the History of Art, Oxford University
ArchBulg – Archaeologia Bulgarica, Sofia
Area – Area, Royal Geographical Society, London
ArheologijaKiiv – Arheologija. Nacional'na akademija nauk Ukraini. Institut archeologii, Kiiv
ArheologijaSSSR – Arheologija SSSR. Svod Archeologičeskih Istočnikov, Moskva
ArhMold – Arheologia Moldovei, Iaşi
BA – Biblioteca de Arheologie, Bucureşti
BARIntSer – British Archaeological Reports. International Series, Oxford
BiblThrac – Bibliotheca Thracologica, Bucureşti
BMC – *Coins of the Roman Empire in the British Museum*, London. I, *Augustus to Vitellius*, 1923; II, *Vespasian to Domitian*, 1930; III, *Nerva to Hadrian*, 1936; IV, *Antoninus Pius to Commodus*, 1968; V, *Pertinax to Elagabalus*, 1950 (H. Mattingly); VI, *Severus Alexander to Balbinus and Pupienus*, 1962 (R.A.G. Carson)
BMJT – Buletinul Muzeului Judeţean Teleorman, Alexandria
BMJTAG – Buletinul Muzeului Județean „Teohari Antonescu", Giurgiu
BSNR – Buletinul Societăţii Numismatice Române, București
Bull. et Mém. de la Soc. d'Anthrop. de Paris – Bulletins et Mémoires de la Société d'Anthropologie de Paris
CA – Cercetări Arheologice, Bucureşti
Caiete ARA - Caietele ARA, Revistă de Arhitectură, Restaurare şi Arheologie, Asociaţia ARA, Bucureşti
CCA – Cronica Cercetărilor Arheologice din România, Bucureşti
CercNum – Cercetări Numismatice, București
Dacia / Dacia NS – Dacia / Dacia Nouvelle Série. Revue d'archéologie et d'histoire ancienne. Académie Roumaine. Institut d'archéologie « Vasile Pârvan », Bucarest
DOW, I – Dumbarton Oaks Catalogues. A. Bellinger, Ph. Grierson (eds.), *Catalogue of the Byzantine coins in the Dumbarton Oaks Collection and in the Whittemore Collection*, I, *Anastasius to Maurice (491-602)*, Washington, 1966 (A. Bellinger)
EAIVR – C. Preda (ed.), *Enciclopedia Arheologiei și Istoriei Vechi a României*, vol. I-III (1994, 1996, 2000), București
EphemNap - Ephemeris Napocensis. Academia Română, Institutul de Arheologie şi Istoria Artei, Cluj-Napoca
Estiot, TM 5 – Sylviane Estiot, *Le trésor de Maravielle (Var)*, în Trésors Monétaires, V, 1983, p. 9-115
Estiot, *Venèra* – Sylviane Estiot, *Ripostiglio della Venèra. Nuovo Catalogo Illustrato* II/1, *Aureliano*, Roma, 1995
Fl – File de Istorie, Bistriţa
FolArch – Folia Archaeologica, Budapest
Giard, *Venèra* – J.-B. Giard, *Ripostiglio della Venèra. Nuovo Catalogo Illustrato*, III/1, *Gordiano III-Quintillo*, Roma, 1995
Göbl – R. Göbl, *Die Münzprägung der Kaiser Valerianus I. / Gallienus / Saloninus (253/268), Regalianus (260) und Macrianus / Quietus (260–262)*, Viena, 2000
IJO – International Journal of Osteoarchaeology
IstMitt – Istanbuler Mitteilungen, Istanbul
Istros – Istros, Muzeul Brăilei, Brăila
JAS – Journal of Archaeological Science, London
JEA – Journal of European Archaeology
JFA – Journal of Field Archaeology

KSIA (Kiiv) – Kratkije Soobščenija Instituta Arheologij Akademij Nauk SSSR, Kiiv
KSIA (Moskva) – Kratkije Soobščenija Instituta Arheologij Akademij Nauk SSSR, Moskva
Ktèma – Civilisations de l'Orient, de la Grèce et de Rome antiques, Strasbourg
MCA – Materiale şi Cercetări Arheologice, Bucureşti
MemAnt – Memoria Antiquitatis, Piatra Neamţ
MIAR – Materialy i issledovanija po arheologii Rossii
MIBE – W. Hahn, M.A. Metlich, *Money of the Incipient Byzantine Empire (Anastasius I – Iustinian I, 491–565)*, Viena, 2000
Mousaios – Mousaios. Buletinul Ştiinţific al Muzeului Judeţean Buzău
MuzNaţ – Muzeul Naţional, Bucureşti
NZ – Numismatische Zeitschrift, Viena
Peuce – Peuce, Studii şi cercetări de istorie şi arheologie, Institutul de Cercetări Eco-Muzeale, Tulcea
Pick, Regling – B. Pick, K. Regling, *Die antiken Münzen Nord-Griechenlands*, I, *Die antiken Münzen von Dacien und Moesien*, Berlin, 1, 1898 (B. Pick), 2, 1910 (B. Pick, K. Regling)
Pink, NZ – K. Pink, *Der Aufbau der Römischen Münzprägung in der Kaiserzeit*. VI/1, *Probus*, NZ, 71, 1946, p. 13-74
Pontica – Pontica. Studii şi materiale de istorie, arheologie şi muzeografie, Muzeul de Istorie Naţională şi Arheologie Constanţa
PZ – Prähistorische Zeitschrift, Berlin-Mainz
RA – Revue Archéologique, Paris
Radiocarbon – An International Journal of Cosmogenic Isotope Research, Cambridge
REA – Revue des Études Anciennes, Bordeaux
RevBistr – Revista Bistriței. Complexul Muzeal Bistriţa-Năsăud, Bistriţa
RevMuz – Revista Muzeelor, Bucureşti
RIC III – H. Mattingly, E.A. Sydenham, *The Roman Imperial Coinage*, III, *Antoninus Pius to Commodus*, London, 1930
RIC IV, 1 – H. Mattingly, E.A. Sydenham, *The Roman Imperial Coinage*, IV, 1, *Pertinax to Geta*, London, 1968
RIC IV, 2 – H. Mattingly, E.A. Sydenham, C.H.V. Sutherland, *The Roman Imperial Coinage*, IV, 2, *Macrinus to Pupienus*, London, 1938
RIC IV, 3 – H. Mattingly, E.A. Sydenham, C.H.V. Sutherland, *The Roman Imperial Coinage*, IV, 3, *Gordian III – Uranius Antoninus*, London, 1949
RIC V, 1 – P.H. Webb, *The Roman Imperial Coinage*, V, 1, London, 1927 (retipărit 1968)
RIC V, 2 – P.H. Webb, *The Roman Imperial Coinage*, V, 2, London, 1933 (retipărit 1968)
RIC VI – C.H.V. Sutherland, *The Roman Imperial Coinage*, VI, *From Diocletian's reform (A.D. 294) to the death of Maximinus (A.D. 313)*, London, 1967
RIC VII – P.M. Bruun, *The Roman Imperial Coinage*, VII, *Constantine and Licinius A.D. 313-337)*, London, 1966
RIC IX – J.W.E. Pearce, *The Roman Imperial Coinage*, IX, *Valentinian I-Theodosius I*, London, 1933 (retipărit 1968)
Ruzicka, *Inedita* – L. Ruzicka, *Inedita aus Moesia Inferior*, NZ, 50, 1917, p. 73–173
Quaternary International – Quaternary International. The Journal of the International Union for Quaternary Research
SAA – Studia Antiqua et Archaeologica, Iaşi
SCA – Studii și Cercetări de Antropologie, București
SCIV(A) – Studii şi Cercetări de Istorie Veche (şi Arheologie), Bucureşti
SCN – Studii şi Cercetări de Numismatică, Bucureşti
SNG IX, BM – Silloge Nummorum Graecorum, IX, The British Museum, I, *Black Sea*, London, 1993
SNG XI, *Stancomb* – Silloge Nummorum Graecorum, XI, *The William Stancomb Collection of coins of the Black Sea Region*, Oxford, 2000
SovArh – Sovetskaja Arheologija, Moskva
SP – Studii de Preistorie, Bucureşti
Stratum(Plus) – Stratum (Plus), Şcoala Superioară de Antropologie, Chişinău, Sankt Petersburg, Bucureşti
StudCom Satu Mare – Studii şi comunicări Satu Mare
StudCom Sibiu – Studii şi Comunicări, Sibiu
Th-D – Thraco-Dacica, București
Tyragetia – Tyragetia. Anuarul Muzeului Naţional de Istorie a Moldovei, Chişinău
Vărbanov – I. Vărbanov, *Greek Imperial Coins and their Values (The Local Coinage of the Roman Empire)*, I, *Dacia, Moesia Superior, Moesia Inferior*, Burgas, 2005
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