A Chalcolithic *tell* from the Neajlov River Basin. Petru Rareş (Giurgiu County, Romania)[1]

Cătălin BEM[*]
Constantin HAITĂ[**]
Andrei ASĂNDULESEI[***]

Abstract: *We reaffirm primarily the fact that the sustainability of a scientific project refers also to the extent to which the research team can have the same scientific endeavours after the project funding ends. It is for the first time that, based on a consistent methodology, developed, evaluated and implemented successfully, a research party has proceeded to the non-destructive investigation of some multilayered Gumelnița's settlements, of the hinterland and their contemporary landscape.*

The tell *at Petru Rareş (Giurgiu County) is one of the investigated sites. For non-destructive evaluation of the site were used the fieldwalking, oblique aerial photographs, magnetometric scanning and the sedimentological coring survey. Interdisciplinary analysis of the data obtained showed the existence of a delimiting ditch of the* tell*, dug at the base of the mound. As in other cases, sedimentologic core drills revealed the presence of a "barrier" between the ditch and the effective inhabited area – no matter what might be named (*bulwark/barrier/dike*) this covering a large area (usually 7.5-8 m wide), but with a relatively low height (less than 1 m in all similar cases).*

The fact that all other small and medium-sized tell *sites investigated by the* Chronos *team presented the same way of construction – boundary ditch,* bulwark/barrier/dike*, the actual residential area, itself firmly bounded (with palisades fixed in foundation trenches, as demonstrated by archaeological excavations or sedimentological core surveys in others sites), leads us to affirm and here that this is the model of the general internal structure of all these settlements.*

Rezumat: *Reafirmăm în primul rând faptul că sustenabilitatea unui proiect științific se referă și la măsura în care un Consorțiu este capabil să aibă aceleași abordări științifice și după încheierea finanțării. Este pentru prima dată când pe baza unei metodologii consistente, elaborată, evaluată și implementată cu succes, s-a procedat la investigarea nedistructivă a unor așezări multistratificate Gumelnița, a hinterlandului şi a peisajului lor contemporan.*

Tell*-ul de la Petru Rareş (jud. Giurgiu) este unul dintre cele cercetate. Pentru evaluarea nedistructivă a sitului s-au folosit periegheza, fotografiile aeriene oblice, scanarea magnetometrică și carotele sedimentologice. Analiza interdisciplinară a datelor obținute a demonstrat și în acest caz existența unui șanț de delimitare al* tell*-ului, săpat la baza movilei. Ca și în alte cazuri, carotajele sedimentologice au evidențiat prezența unei „bariere" între șanț și zona efectivă locuită – indiferent de cum s-ar putea numi (*parapet/barieră/dig*), aceasta acoperă o suprafață mare (de obicei 7,5-8 m lățime), dar cu o înălțime relativ mică (mai puțin de 1 m în toate cazurile similare).*

Faptul că toate celelalte tell*-uri de mici și medii dimensiuni investigate au prezentat același mod de construcție – limita șanțului,* parapetul/bariera/digul*, zona rezidențială propriu-zisă, ea însăși ferm delimitată (cu palisade fixate în șanțuri de fundație, așa cum este demonstrat de săpături arheologice sau sondaje*

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[*] Museum of Ialomița County, Slobozia, Romania; catalinbem@yahoo.com.
[**] National Museum of Romania History, Bucharest, Romania; costel_haita@yahoo.com.
[***] 'Alexandru Ioan Cuza' University in Iaşi, Arheoinvest Center, Iași, Romania; andrei.asandulesei@yahoo.com.

sedimentologice în alte situri), ne determină să afirmăm și aici că acesta este modelul structurii interne generale a tuturor acestor așezări.

Keywords: *Gumelnița,* tell*, sedimentological corings, aerial photography, magnetometry, delimitation elements.*

Cuvinte-cheie: *Gumelnița,* tell*, carotaje sedimentologice, fotografie aeriană, magnetometrie, elemente de delimitare.*

◈ Premises. Background and site description

In the series of non-destructive researches of the Eneolithic stations in the Gumelnița area, whose debut is marked by the establishment of the *Chronos* consortium in 2008[2], we also paid special attention to the only concentration of 'giant' *tells* north of the Danube (Bem *et alii* 2012; 2014), all on the administrative territory of Giurgiu County (Romania) – Schitu *Măgura lui Boboc* (Schitu commune), Stoeneşti *Măgura Tangâru* (Stoeneşti commune) and Uzunu *Balta cu Bivoli* (Călugăreni commune). To these is added, in the eastern extremity, the *tell* from Brănişatari *Popina* (Călugăreni commune) and, respectively, in the western one, the *tell* from Petru Rareş[3] (Izvoarele commune). Except for the last one, we discussed all or each of them separately in a series of other interventions (Bem *et alii* 2010; 2011; 2012; 2014).

The Petru Rareş *tell* is located in the south of Muntenia (Romania) (fig. 1), in the Burnas Plain, approximately 500 m north of the edge of the village on whose territory it is located. It stands on the smooth slope of the low terrace, on the right side of the Izmar stream – in the connection area with its meadow (fig. 5-6) –, today right on the shore of the small lake created after the damming of the watercourse (fig. 4). The late administrative foundation of the village[4] explains its non-appearance on the older maps – *Specht Map* (1790-1791) (fig. 2) or *Charta României Meridionale*[5] (Szatmáry) from 1864. Not only is the anthropic mound not topographically marked but the course of the Izmar stream is not depicted either. All data regarding these elements appear cartographically only starting with the third Austrian topographic survey (fig. 3). The representation of the *tell* implies dimensions important enough to be retained in the measurements from the end of the 19th century. Izmar (erroneously named[6] on the last cartographic creation mentioned), one of the few streams in Muntenia that flows from south to north, is the right tributary of Câlnişţea (both part of the Neajlov basin) – at the confluence of the two streams, approx. 4.6 km north-northwest of the Petru Rareş settlement, the *tell* from Schitu *Măgura lui Boboc* is located.

[2] Its two main members were at the National Museum of Romania History and the 'Alexandru Ioan Cuza' University in Iași, through the Arheoinvest Platform. Today, the situation is slightly different.

[3] The *tell* came to the attention of the *Chronos* team in 2010 when the first field evaluation was carried out. Afterward, we took the usual steps of a non-destructive investigation.

[4] The village of Petru Rareş was established by the appropriation, in 1882, of 19 married families with lands in the area of the former Albele estate (Lahovari *et alii* 1898, p. 36); this is also the first name of the newly established village. At the beginning of the 20th century, it was already called Petre Rareş (Lahovari *et alii* 1901, p. 687).

[5] http://www.charta1864.ro/charta.html.

[6] Câlnișțea, on the map. Another name of the stream – Saliu – appears only in connection with the publication of the first archaeological researches (Berciu 1937b, p. 2-3). Very likely, it is related to the name of a fragment of the former Albele estate – Şialiul (Lahovari *et alii* 1898, p. 36).

The successive portions of the water body of the Izmar stream, created by the dams of the post-war period (fig. 4, 7-8), undoubtedly correspond to the older marshy areas (fig. 3). The landscape transformations affected, however, both the characteristics of the Izmar valley, as well as the integrity and dimensional elements of the *tell*. It will not have been the first and, unfortunately, it is not the last site brutally affected. At least one-third was destroyed (fig. 7-8) – probably even during the construction of the dikes.

The *tell* was *systematically* researched by Dumitru Berciu in 1933 and 1935 (Berciu 1935, p. 29-30; 1937a; 1937b) and probed in 1957 (Berciu 1959; 1961). We try to note here, following these interventions, only the size of the investigated surfaces[7] and the *cultural extent* of the stratigraphy[8] – no less than nine 'levels', without a caesura between them and developed in a maximum of only 2.40 m vertical and on an estimated surface at 35 × 50 m (Berciu 1937a, p. 3) or 40 × 50 m (Berciu 1959, p. 145). We will return to these elements below.

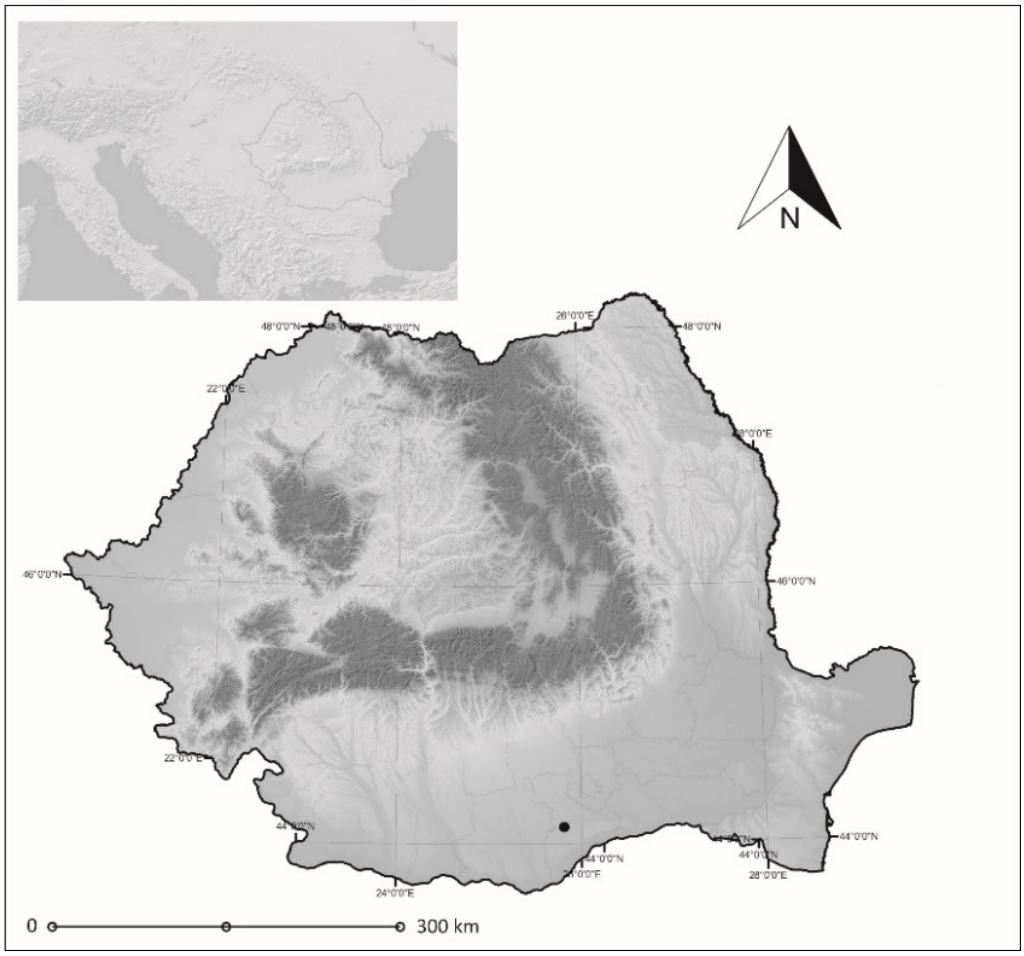

Fig. 1. The location of the site from Petru Rareș.
Localizarea sitului de la Petru Rareș.

[7] We have no data on the size of the areas surveyed in 1933 and 1935. Also, their locations are not indicated anywhere within the site. We can only assume that they were in the *tell*'s maximum altitude area. The 1957 survey had an area of 2 × 10 m (Berciu 1959, p. 145), also with an unknown location.

[8] The ambiguity of the cultural attribution derives both from the doubling of the logos of the Gumelnița phenomenon (A1/I etc.) and the introduction of an early facies (of the Petru Rareș type), but also, more importantly, from the desire to identify at any cost, in a stratigraphy, an evolution as complete and complex as possible.

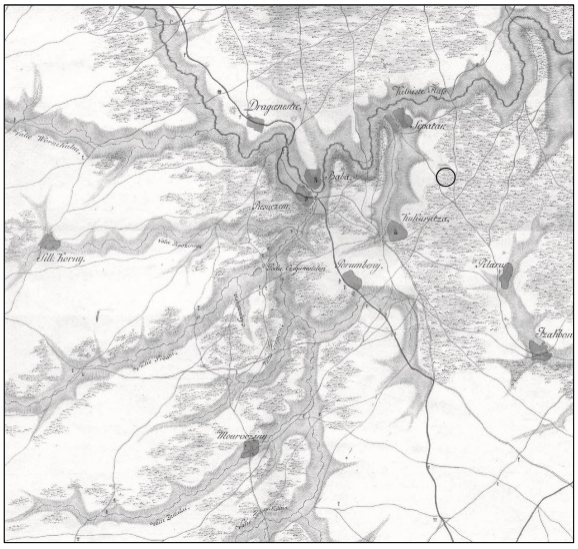

Fig. 2. The *Specht Map* (1790) – the black circle indicates the zone of the *tell* from Petru Rareș.
Harta Specht (1790) – cercul negru marchează zona *tell*-ului de la Petru Rareș.

Fig. 3. The third Austrian topographic survey (taken over by *Map Master Plan*), end of the XIXth century. A black circle marks the *tell*.
A treia ridicare topografică austriacă (preluată de *Planul Director de Tragere*), sfârșitul sec. al XIX-lea. *Tell*-ul este marcat prin cercul negru.

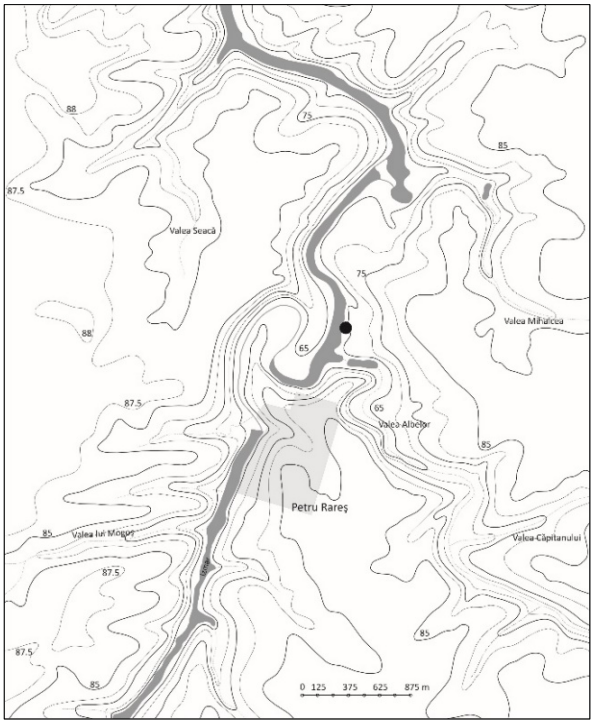

Fig. 4. The position of the *tell* from Petru Rareș. Topographic survey from the 1960s.
Amplasamentul *tell*-ului de la Petru Rareș. Ridicare topografică din anii 1960.

Fig. 5. The zone of contact with the terrace of Izmar River (view from the west) and the position of the delimiting ditch of the *tell*.
Zona de legătură cu terasa Izmarului (văzută dinspre vest) și amplasamentul șanțului de delimitare al *tell*-ului.

The following lines come to complete and finalize our earlier studies regarding the model of the primary internal organization structure of the *tells* (Bem *et alii* 2012). They are

based on frequent scientific returns to the Petru Rareş area, especially within the mentioned *Chronos* project, and they will only resume the essential, synthetic elements from the mentioned studies, without insisting. We refer to different and diverse aspects, from the *stratigraphic main feature* (Bem *et alii* 2013a, p. 92-93; 2013b, p. 213) to the delimiting elements – ditch, dike/wave, palisade (Bem *et alii* 2012, p. 32; 2013a, p. 93; 2013b, p. 214).

Fig. 6. View of the *tell* from the east (from the terrace of Izmar). The arrow indicates the connection zone with the terrace and the position of the delimitation ditch.
Vedere asupra *tell*-ului dinspre est (dinspre terasa Izmarului). Săgeata indică zona de legătură cu terasa și amplasamentul șanțului de delimitare.

Fig. 7. Aerial oblique photography (photo C. Miu, 2007) from the north to the *tell* from Petru Rareș. The two groups of arrows frame the delimitation ditch.
Fotografie aeriană (foto C. Miu, 2007) dinspre nord asupra *tell*-ului de la Petru Rareș. Cele două grupe de săgeți încadrează șanțul de delimitare.

Fig. 8. Aerial oblique photography (photo C. Miu, 2007) of the *tell* from Petru Rareș. The two groups of arrows frame the delimitation ditch.
Fotografie aeriană (foto C. Miu, 2007) asupra *tell*-ului de la Petru Rareș. Cele două grupe de săgeți încadrează șanțului de delimitare.

◈ Methods

Naturally, and according to the methodology defined and implemented within *Chronos* and later, we used a set of complementary methods for the non-destructive evaluation of the station – field research, oblique aerial photography, magnetometric measurements, and sedimentological corings.

The field survey had in mind, above all, the identification of the possible habitation outside the *tell* and the recovery of archaeological material to ensure a cultural attribution, but also the verification of the geomorphological conditions of the location and the estimates regarding the dimensions of the known site.

The realization of the **oblique aerial photographs** was made possible using a Cessna SkyHawk 172H aircraft and with the help of a Canon EOS 400D DSLR camera. Geographical coordinates and flight path were recorded with a Mio 650 GPS, using the IGO 2008 software.

The magnetometric scan covered an area of 2400 sqm (30 × 80 m), including portions of the effectively inhabited surface of the *tell*, as well as areas outside the anthropic mound (fig. 9). The measurements were made with a *Sensys* magnetometer, with five sensors installed on a cart.

The sedimentological core drilling (fig. 9) had in mind, on the one hand, the verification of the magnetometric scan, and, on the other hand, the obtaining of stratigraphic details both in the area of the *tell* and of the outer dwelling in its south. A manual soil core drill was used, with a probe diameter of 7.5 cm, the successive altimetric steps for sediment recovery being 10 cm. These were analyzed in the laboratory (annex-tables), the archaeological materials being separated and integrated into the graphic columns (fig. 13-16). The maximum sampling depth was conditioned by the maximum length of the core rods (in the present case 2.50 m) – Sc1 (fig. 13) and Sc3 (fig. 16) –, or by the interception of natural levels – a-b (fig. 12), Sc2 (fig. 15) and Sc4 (fig. 14).

Fig. 9. The location of sedimentological corings (Sc0-Sc5, a-b) and the surface investigated by magnetometry (the rectangle marked by the white points) on an orthophoto map. The zone of occupation and the delimitation ditch are visible.
Amplasamentul carotajelor (Sc0-Sc5, a-b) și al suprafeței investigate magnetometric (dreptunghiul delimitat de punctele albe) pe ortofotoplan. Zona locuită și șanțul de delimitare sunt vizibile.

Fig. 10. The map of the magnetometric scan (the black arrow indicates the delimitation ditch; the white one indicates the positive anomaly verified by coring Sc5).
Harta scanării magnetometrice (săgeata neagră indică șanțul de delimitare; cea albă anomalia pozitivă verificată prin carotajul Sc5).

◈ Results and discussions

As happens in many old cases, the evaluation of the height and, especially, of the surface of the *tell* remains only at the estimation level if it is not carried out at least topographically.

Topographical elements, the analysis of georeferenced aerial photographs, but also of orthophoto maps, offer the possibility of reconstructing the dimensions of the Petru Rareș *tell*. Located towards the base of the Izmar terrace, on the slope, as described above, the site was partially destroyed by the fishing and land developments. The extrapolation of the slightly oval outline fragment (fig. 9), to complete it (to the west), indicates a completely different surface than the one previously estimated. Taking into account the mentioned data and taking into account the type of mathematical expression (Bem *et alii* 2012, p. 20), the *tell* from Petru Rareș had a maximum diameter of at least 70 m, approximately in the north-south direction (facing of 50 m in Berciu 1959, p. 145), and one of approx. 76 m in the east-west direction (compared to 35-40 m in Berciu 1959, p. 145). Without changing its classification in the category of medium-sized *tell*, its surface area is significantly larger than that specified previously.

The relative difference between the maximum elevation point of the *tell* and the base of the anthropic mound in the southeastern area reaches 2.60 m. As we will detail below, the thickness of the deposits from the stratigraphically not intersected area must be added to them, due to the lack of other coring rods, in Sc1 sedimentological coring. Therefore, the maximum amplitude is greater than the 2.40 m previously mentioned (Berciu 1937a, p. 3). In addition,

the area is still subjected today to deep ploughing, probably this being the cause[9] for the stratigraphic 'anomalies' revealed by the upper parts of some corings, as well as the faulty magnetic signal, in some cases.

Following the magnetometric scan, numerous positive anomalies were recorded on the surface of the *tell*, some of them exceeding 20 nT (fig. 10-11). These can be attributed, above all, to some structures of an archaeological nature, burnt or unburnt, but also to some pits. Unlike many other situations (for example, at Vânătorii Mici – Bem *et alii* 2013b, p. 214, pl. X/4, or Udupu – Bem *et alii* 2011, p. 26, fig. 4), the magnetic signal from the central surface of the *tell*, actually inhabited, has very important fluctuations. Spaces with a negative magnetic signal can be linked to contemporary disturbances – pits or previously investigated sections. Probably, the limit of the actually inhabited area is placed on a line that evolves from the east of Sc5 towards the half distance between Sc4 and Sc2 (fig. 11), over a distance[10] of at least 30 m.

The route of the ditch delimiting the *tell* was identified in the eastern part of the site, approximately in the center of the magnetometrically scanned surface. The detected positive anomaly does not exceed 5 nT, the contrast being weak, probably also due to the recent agricultural works carried out in the area, which disturbed the trench in its upper part. The width at the mouth of the boundary element, based on the magnetic signal, varies between 5 and 10 m. The important alveolation, which initially follows the current slope of the Izmar terrace, can naturally be attributed, in the local topographical conditions, to an excavation – or an unnatural obstacle – moreover, easy to identify in aerial photographs (fig. 7-8) or even those from the ground (fig. 5-6).

The field survey led to the identification of the habitation outside the *tell*. Around it, on a radius that varies, depending on the microtopography of the area, between 120 and 150 m, Gumelnița ceramic fragments were recovered, from the Bronze Age and from the X-XIth centuries AD. The situation is identical to the one in the case of the *tells*, regardless of the dimensional class, organized on or immediately next to any terrace, regardless of whether or not anthropogenic deposits end up covering it – Vătași *Măgura*, Stoenești *Măgura Tangâru*, Schitu *Măgura lui Boboc*, etc. The analysis of the oblique aerial photographs did not provide any additional information regarding the outer habitation, not even regarding its boundaries.

The sedimentological corings (fig. 9, 11) had in mind (1) the verification of the geomorphological framework of the settlement and the pinpoint highlighting of the external dwelling structure, (2) the verification of a positive, circular magnetic anomaly in the northern area of the *tell* (a very likely pit) and (3) verification of the general scan and stratigraphic nuance of the internal structure of the site.

(1) Two corings were made in the outer area of the *tell*, to the south, at 32 m, on an east–west oriented axis, 20 m from each other (fig. 9/a-b).

Both revealed the same stratigraphy (fig. 11) – after the current, plowed soil level, 0.30 m thick, follows a second soil horizon, between -0.30/-0.60 m, which includes a series of sub-centimeter ceramic fragments, as well as rare millimeter fragments of burnt adobe and charcoal.

Between -0.60 m and -1.40 m, a third soil horizon includes very rare anthropogenic constituents, which can be interpreted as a paleosol level on which the Eneolithic habitation

[9] Undoubtedly, the annual plowing affected, destroying, the upper level of the site and contributed to its permanent decrease in height.

[10] The limit continues, of course, also outside the scanned area, being able to reach 44 m. The actual inhabited area thus approached 2000 sqm.

outside the *tell* developed, as indicates the fact that from -1.40 m begins the level of *læss*, sterile, natural deposits.

Although no typical archaeological materials were recovered from the two corings, the ceramic fragments on the ground surface can be attributed to the first Gumelniţa stages, A1 and A2.

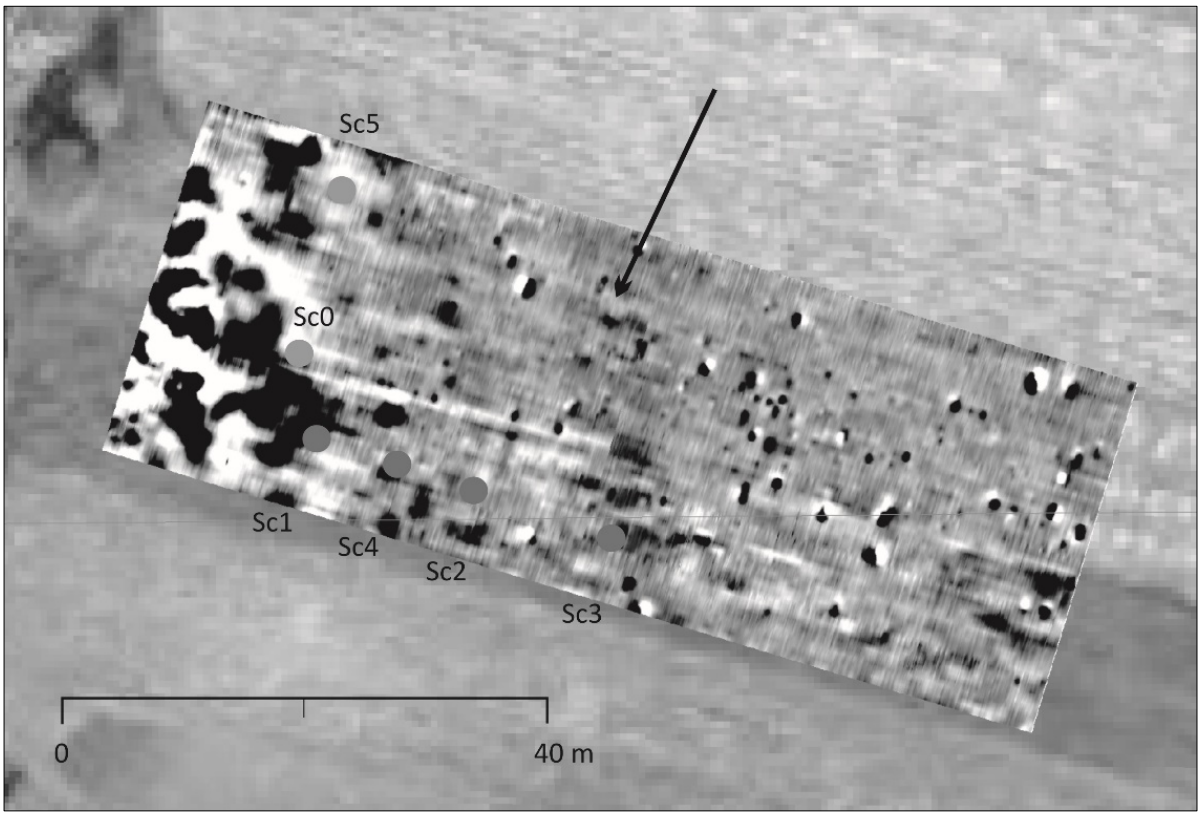

Fig. 11. The map of the magnetometric scan – detail.
Harta scanării magnetometrice – detaliu.

(2) The verification coring (Sc5) of the circular positive magnetic anomaly (with a diameter of approx. 0.75 m) in the northern area (fig. 10-11) revealed a single type of sediment at a depth of 1.40 m – very heterogeneous, of a medium greyish brown color, with frequent organic constituents, including large fragments of burnt adobe. All the archaeological materials belong to the Gumelnița environment. The anomaly is centered on an approximately square surface (with a generally negative magnetic signal) with a side of about 5 m. It is very likely that it corresponds to one of the surfaces investigated in the interwar period by D. Berciu. The stratigraphy behaves in the same way in the case of coring Sc0 (fig. 10-11), at least apparently also located in an area (approx. 2 × 5 m) with a general negative magnetic signal. And in this case, it is very likely to have intercepted an older archaeological intervention.

(3) The four corings that make up the relevant group for the nuance of the internal structure of the *tell* will be presented in order, starting with the one made in the area of maximum altitude (Sc1 – Sc4 – Sc2 – Sc3). They were located on an axis roughly oriented northwest-southeast, parallel to the long sides of the magnetometrically investigated surface (fig. 9, 11). As in all other cases, some mentioned above, the fundamental elements of the magnetic map were confirmed by the sedimentological corings.

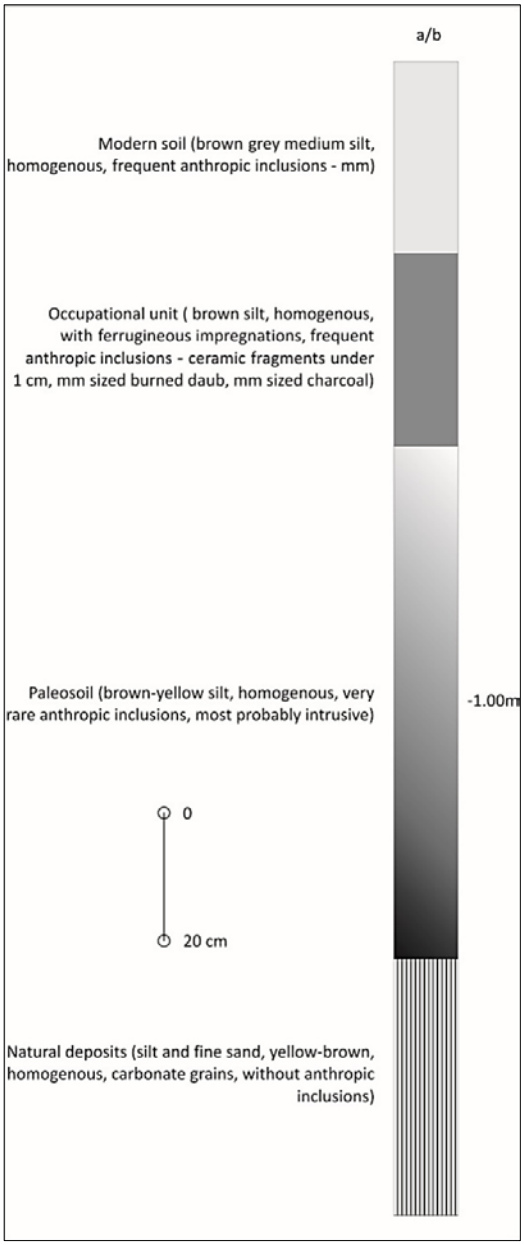

Fig. 12. The stratigraphy of the corings from the zone of external occupation of the *tell*.
Stratigrafia carotajelor din zona locuirii exterioare *tell*-ului.

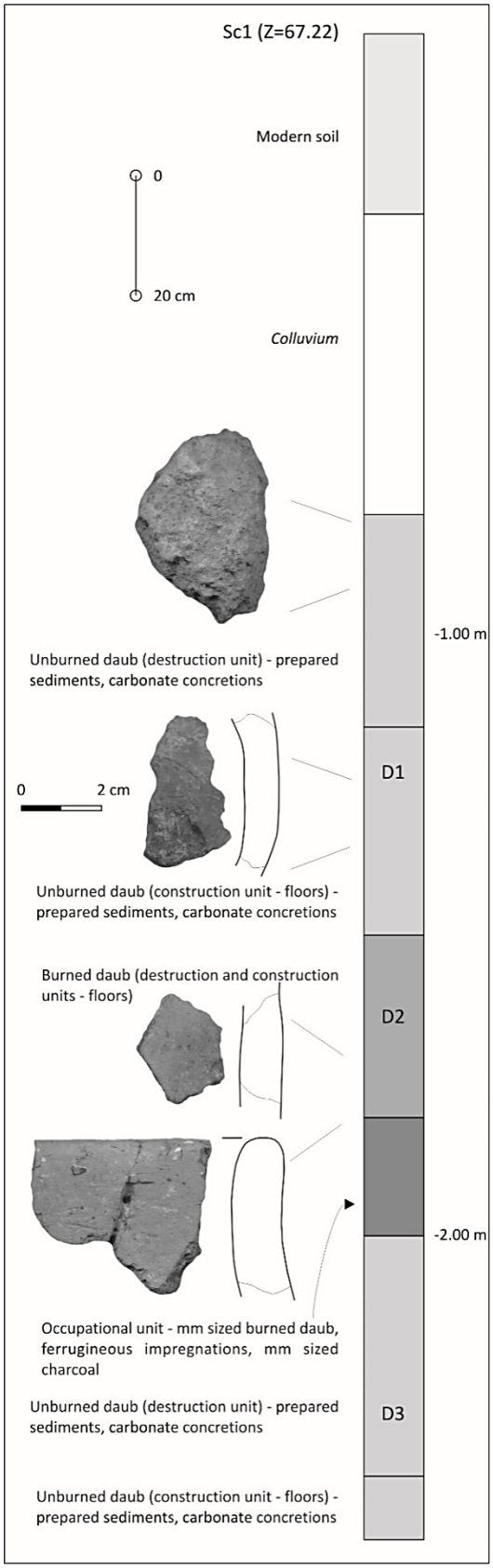

Fig. 13. The stratigraphy of the coring no. 1 (Sc1).
Stratigrafia carotajului nr. 1 (Sc1).

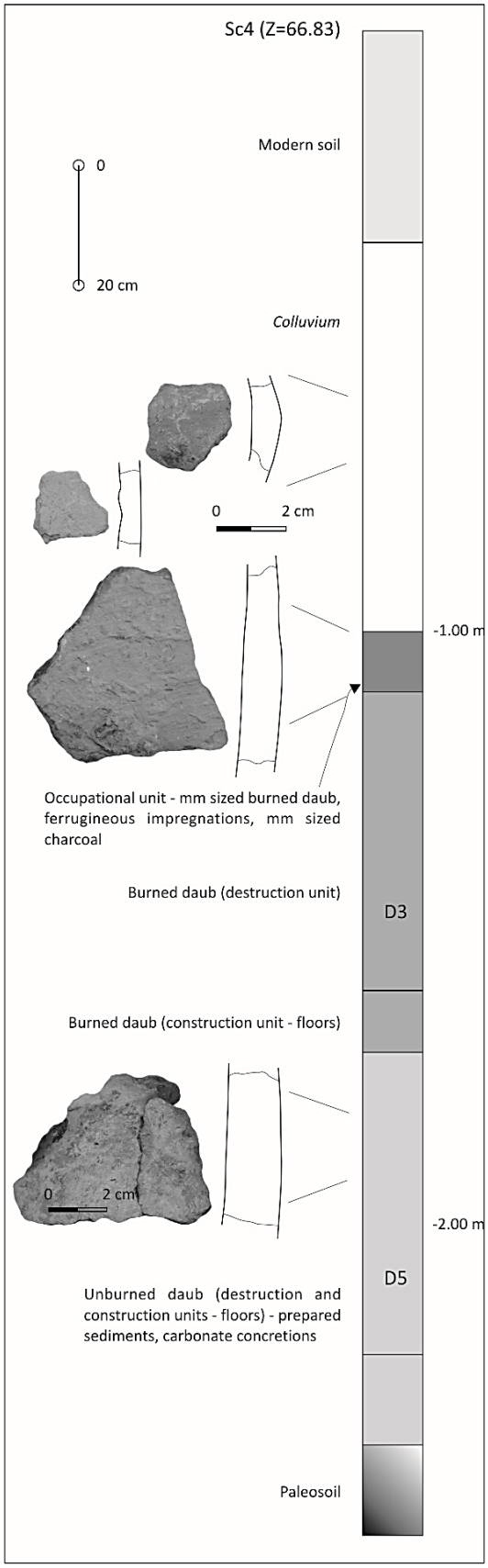

Fig. 14. The stratigraphy of the coring no. 4 (Sc4).
Stratigrafia carotajului nr. 4 (Sc4).

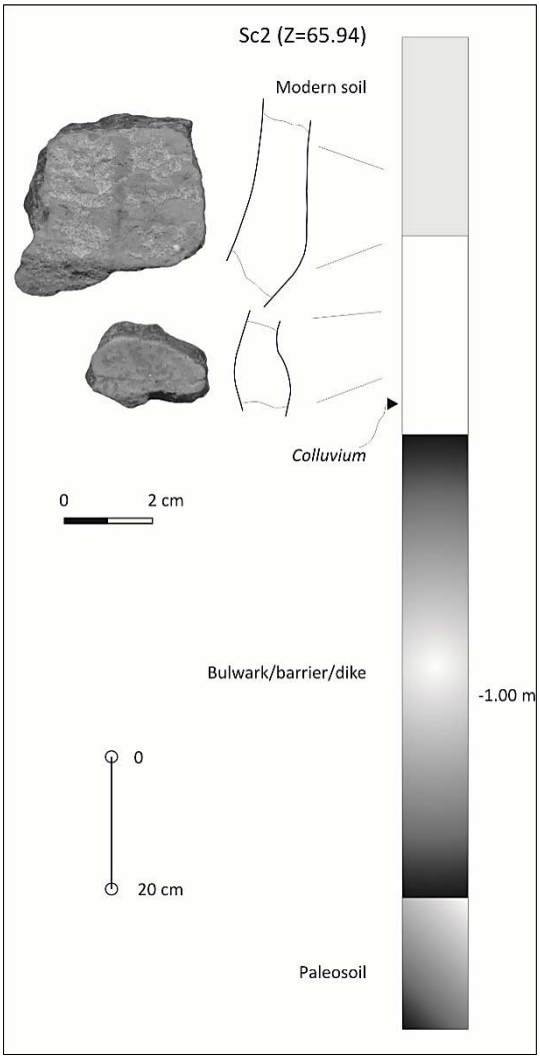

Fig. 15. The stratigraphy of the coring no. 2 (Sc2).
Stratigrafia carotajului nr. 2 (Sc2).

Therefore, Sc1 (fig. 13) was located in the area of maximum altitude of the *tell*. The current ground level[11] (being 0.30 m thick) (Bem *et alii* 2013a, p. 92, category 1), overlies an unexpected colluvium level of 0.50 m thick, with a preponderance of burnt adobe fragments within the archaeological material. These correspond in Sc4 (located 7 m down the slope of the *tell*) to similar levels (fig. 14), with a thickness of 0.35 and 0.65 m, respectively. The colluvium zone at the top of the *tell* can be interpreted as a space of post-depositional/post-abandonment degradation of some housing units. These could correspond to a last level of habitation **(1)**[12], very likely burned (as in the case of most sites of this kind), affected by deep plowing, but also by the oldest archaeological researches. In Sc4 of this last stratigraphic expression also belongs the approx. 10 cm (fig. 14) of a former occupational level that was outside a burned construction (Bem *et alii* 2013a, p. 93, category 2).

The first coherent deposits, stratigraphically *in situ*, begin in Sc1 at the relative depth of 0.80 m. Unfolded over a local thickness of 0.70 m, they are represented by manmade materials **(2)** with numerous carbonate concretions and rare anthropogenic constituents, representing the remains of unburned parts of a building (Bem *et alii* 2013a, p. 93, category 3). The upper part corresponds to the abandonment/destruction level of the dwelling, while the lower half is constituted by a compact sequence of constructive units – no doubt the platform and its clay plaster coatings. The construction stood directly on the remains of a burnt dwelling **(3)**, marked by a compact deposit of burnt adobe (Bem *et alii* 2013a, 93, category 5) which includes, over a thickness of 0.30 m, only the remains of burnt walls, very likely, from the immediate exterior of the built surface. This superimposes a former occupational level outside a burnt house, having the known characteristics (Bem *et alii* 2013a, p. 93, category 2) and representing deposits contemporaneous with the use of the above-mentioned construction. Without a caesura, it follows – in reverse stratigraphically – remains **(4)** of the walls of an abandoned, unburnt house, which overlap, of course, its constructive elements – the floors (Bem *et alii* 2013a, p. 93, category 3).

In Sc1, the natural foundation was not intercepted, as mentioned above, but a level of paleosol developed on the *læss* is undoubtedly individualized at the base of Sc4 (fig. 14; 17-18). On this natural level, the first constructive horizon of the *tell* **(4)** develops, marked in our cores by the remains of unburnt houses. This is also one of the few oldest pieces of information that seems to be confirmed, an unburnt building from the base of the *tell* being partially investigated in the interwar period (Berciu 1937a, p. 4). The burned dwelling, which stratigraphically overlaps this early horizon in Sc4, marks a phase **(3)** that can be equated to that represented by the same type of depositional expression in Sc1. From the stratigraphic column of Sc4, however, the corresponding component in Sc1 to the logo **(2)** is missing. The vertical accumulation of sediments and, implicitly, the reduction of the buildable surface, but probably also the post-depositional events are possible causes of this absence.

Sc2 was located down the slope of the anthropic mound, 6.7 m from Sc4 (fig. 11). The natural soil and the level of colluvium[13], whose presence here may be natural, overlap a deposit of approximately 0.70 m thick clayey silt (fig. 15), generally heterogeneous, with rare carbonate granules and without anthropogenic constituents. Developed on the same paleosol

[11] The sedimentological description and the interpretation of the stratigraphic sequences of the corings are detailed in the annex-table.

[12] The numbers can be found in the combined illustration (fig. 17-18) and mark very likely equivalences of stratigraphic phases/periods (see also Randoin *et alii* 2000, p. 220).

[13] Each of these has a thickness of approx. 0.30 m.

level, it corresponds to what I have called on other occasion bulwark/barrier/dike (*e.g.*, Bem *et alii* 2013a, p. 93).

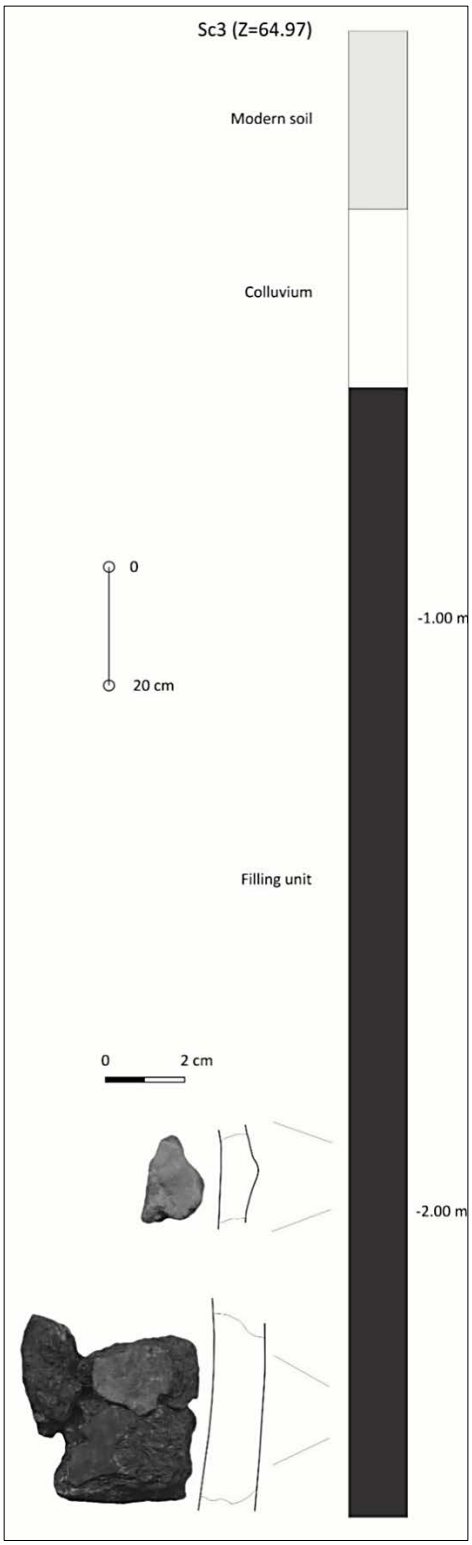

Fig. 16. The stratigraphy of the coring no. 3 (Sc3).
Stratigrafia carotajului nr. 3 (Sc3).

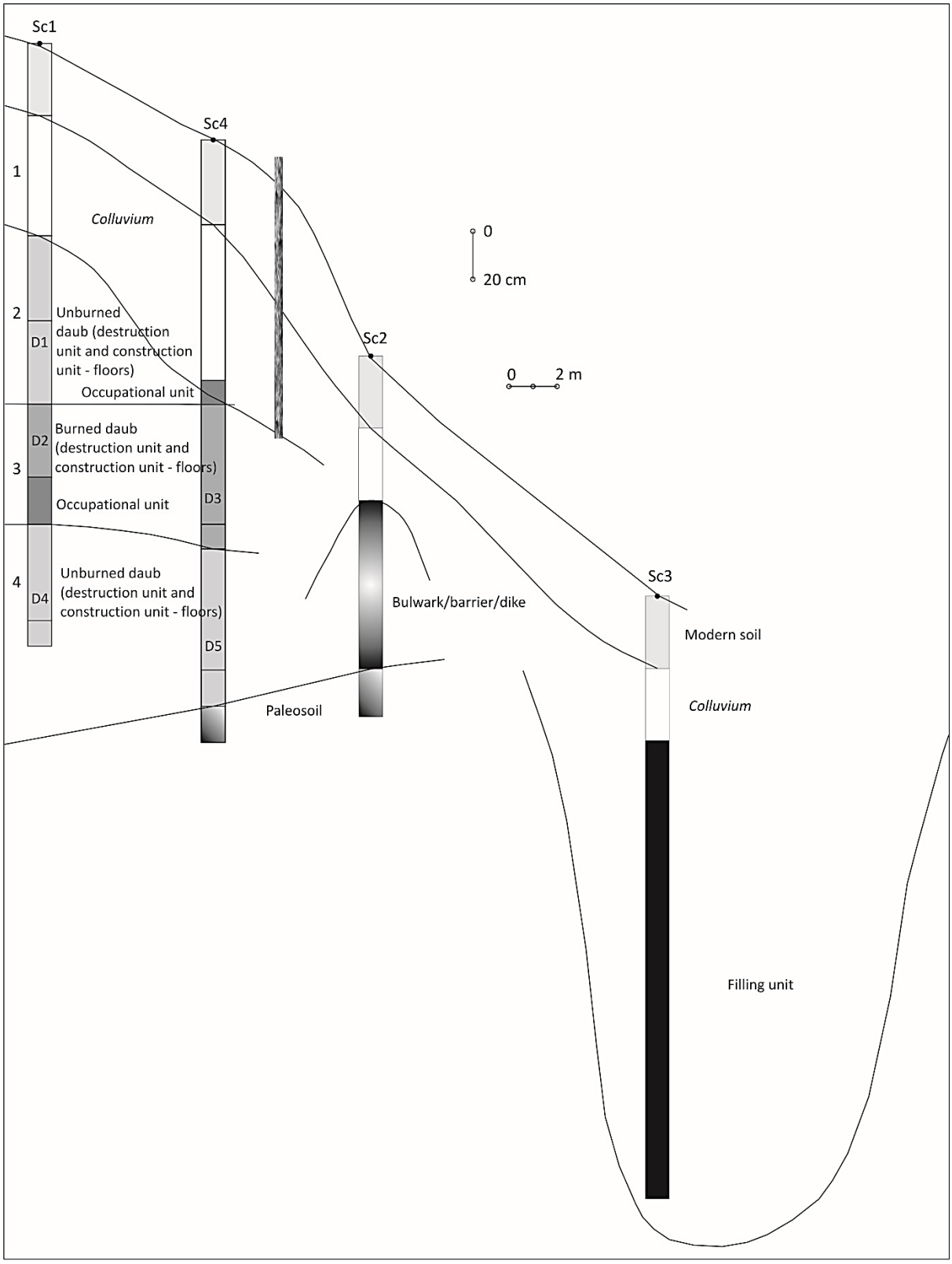

Fig. 17. The stratigraphic sketch of the *tell*, revealed by the four sedimentological corings.
Schița stratigrafică a *tell*-ului relevată de cele patru carotaje sedimentologice.

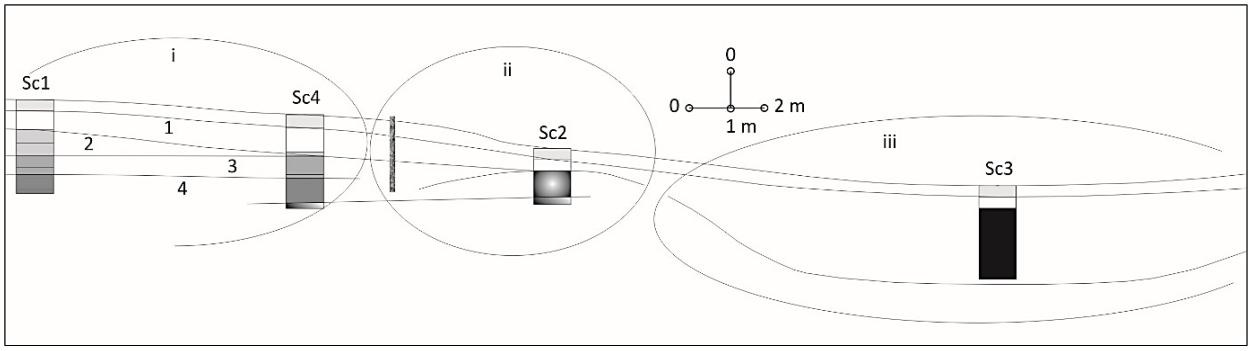

Fig. 18. The main zones of evolution/accumulation.
Zonele principale de evoluție/acumulare.

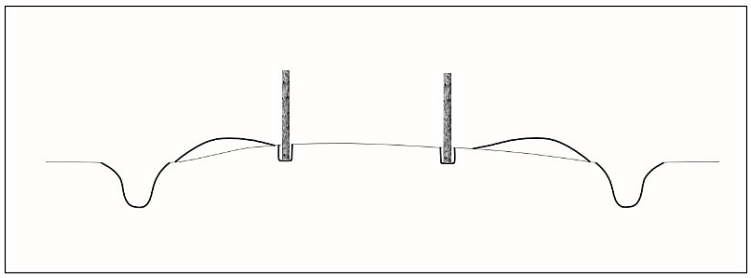

Fig. 19. The idealized sketch of the beginning of each independent occupation of a *tell* (after Bem *et alii* 2013b).
Schița idealizată a momentului de început a fiecărei locuiri independente dintr-un *tell* (după Bem *et alii* 2013b).

Finally, Sc3 was made 12 m from Sc2 (fig. 11), in the minimum relative altitude area (fig. 18) of the string of corings. The same levels of the current soil and colluvium (and here natural) cover (fig. 16) a silty clay, generally of a dark brown color, homogeneous, with very rare very fine, millimetric anthropic constituents, whose lower limit is below the depth of which the corer rods allowed us to reach. Exceeding, therefore, 1.90 m thick, it undoubtedly represents the filling of the boundary trench identified magnetometrically and on the basis of aerial photographs.

◈ Conclusions

Therefore, a stratigraphic sketch of the Petru Rareş *tell* includes three main areas of evolution/accumulation (fig. 18):

i. the area actually inhabited, with at least three important moments of construction and living,

ii. the secondary delimitation space – mainly by bulwark/barrier/dike,

iii. the main boundary area – the circular ditch.

The chronological order of the three is in reverse.

As in the case of the other *tells* investigated within the *Chronos* project or earlier (Teiu – Morintz 1962; Bucşani – Bem *et alii* 2010; 2011), the one at Petru Rareş has a central residential area (affected by contemporary anthropic interventions, including archaeological excavations of large stratigraphic extent) developed on an area of approx. 2000 sqm. The ten[14] "levels" identified with false precision previously (Berciu 1937a, p. 4; 1959, p. 145) cannot find their place in the constructive sequence revealed by our cores, at least because they are the expression of ten different cultural moments. Naturally, without proper new research, we will not know exactly which chrono-cultural manifestations can be attributed to the various deposits. The archaeological materials (fig. 13-16) recovered by us through the cores belong to the Gumelniţa phenomenon for sure, but they do not allow nuances.

The delimitation system is also identical - the secondary one (bulwark/barrier/dike) also includes the very likely palisade (undoubtedly rebuilt several times), as it exists in the majority of small and medium-sized *tells* that have been intrusively surveyed, Bucşani *Pod* and Bucşani *Pădure tell* (Bem *et alii* 2010; 2011), or investigated only non-destructively – mentioned above. Similar situations, but not surprising, seem to appear south of the Danube as well (Aslanis 2015).

The model of the general internal structure, at least for small and medium-sized *tells* (Bem *et alii* 2013b, p. 215, pl. X/6) can be graphically represented by the idealized sketch (fig. 19) of the beginning of each independent dwelling part of a *tell* (Bem 2007, p. 5; Bem *et alii* 2010; 2012; 2013a; 2013b; 2014). As we mentioned on different occasions, we think that each delimitation trench (as well as each group of foundation trenches for palisades) corresponds to a foundation and, implicitly, a new community that carries it out. The fact that only one boundary ditch[15] was identified at Petru Rareş confirms the evolution without stratigraphic caesura and habitation.

All the *tells* investigated magnetometrically (over 25 within the *Chronos* project and over 20 later) are bounded by at least one ditch, which remained open, if we extrapolate the archaeological information obtained following the research at Bucşani, for a long time. All were dug in the meadow, outside the original ridges. The precise delimitation – through one or more ditches – of the space actually intended for living involved a progressive narrowing of it, as anthropogenic deposits accumulated vertically. There are no situations in which the dwelling has extended outside the initially delimited surface, covering the ditches. The omnipresence of outer dwellings is not directly related to what happens on the *tell*. It is not excluded that this is one of the causes of the existence of a very large number of Gumelniţa *tells*, most of them small and medium in size – the prohibition not to exceed the initial spatial limits of the settlement determined, over time, repeated migratory movements of some parts of communities. They will have founded new settlements, applying the same model.

[14] The stratigraphy of a *tell* is complex and, most often, impossible to separate horizontally. The alert rhythm of construction and depositional accumulation in a continuous habitation, as it was probably happening at Petru Rareş and as we noticed ourselves through the coring, makes a cultural division of the deposits risky. To the nine levels announced as having been identified in 1957 (Berciu 1959, p. 145) is added the one investigated in the interwar period, considered Gumelniţa III, therefore B1 (Berciu 1937a, p. 4).

[15] A second boundary ditch was not identified either magnetometrically or by aerial photography.

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Annex-tables. Description and interpretation of the stratigraphic sequences of corings 1-4. In the last column, the logos of the construction and habitation levels are marked, with the logos of the dwellings being indicated in brackets – D. All of them can also be found in the illustration (fig. 13-14; 17).
Descrierea și interpretarea secvențelor stratigrafice ale carotajelor 1-4. În ultima coloană sunt marcate siglele nivelurilor de construcție și de locuit, siglele locuințelor fiind indicate între paranteze – D. Toate acestea se regăsesc și în ilustrație (fig. 13-14; 17).

Sc1

Depth (cm)	**Description**	**Interpretation**	
0-15	Medium-dark brown, homogenous silty clay with rare fine grains of burnt daub.	Modern soil	
15-30	Medium brown silty clay, slightly heterogeneous, with rare fine grains of burnt daub.		
30-40	Light-medium brown silty clay, slightly heterogeneous, with rare fine grains of burnt daub and carbonates, centimeter dimensions (cm).	Colluvium	1
40-50	Medium grey-brown silty clay, homogeneous, with rare fine grains of burnt daub, very rarely ~1 cm, rare carbonates.		
50-60	Grayish-medium brown clayey silt, relatively heterogeneous, with rare carbonates and millimetric (mm) grains of burnt daub.		
60-70	Light greyish brown silty clay, heterogeneous, with rare fine grains of burnt daub, frequent carbonates, 1-2 cm.		
70-80	Light greyish brown silty clay, heterogeneous, with rare fine grains of burnt daub, frequent carbonates, 1-2 cm.		
80-90	Yellowish brown clayey silt, relatively homogeneous, with more frequent carbonate grains (~5%) (fig. 13).	Unburnt destruction	2 (D1)
90-100	Yellowish brown clayey silt, relatively homogeneous, with more frequent carbonate grains (~5%).		
100-115	Light brown/yellowish clayey silt, relatively homogeneous, with very rare mm grains of burnt daub and more frequent carbonates.		
115-130	Light brown/yellowish clayey silt, very homogeneous, with very rare mm grains of burnt daub and carbonates, a cm ceramic fragment (fig. 13).	Constructed floors	
130-140	Light brown clayey silt, homogeneous, with very fine plant impressions, and very rare carbonate granules, mm.		
140-150	Light brown clayey silt, homogeneous, with very fine plant impressions, and very rare grains of burnt daub, mm.		

150-160	Medium brick-brown silt, relatively heterogeneous, with very frequent grains of burnt daub, mm-cm.	Burnt destruction	3 (D2)
160-170	Medium gray-brown and brick-brown clayey silt, heterogeneous, with frequent grains of burnt daub mm-cm and coal.		
70-180	Medium gray-brown and brick-brown clayey silt, heterogeneous, with frequent grains of burnt daub mm-cm, a bone fragment cm, and a cm ceramic fragment (fig. 13).		
180-190	Medium grey-brown clayey silt, relatively heterogeneous, with rare coal grains cm, a cm ceramic fragment (fig. 13).	External occupational level	
190-200	Medium grey-brown silt, relatively heterogeneous, with carbonates and rare coal grains cm.		
200-210	Light-medium greyish-brown clayey silt, relatively homogeneous, with rare organic inclusions.	Unburnt destruction	4 (D4)
210-230	Light-medium greyish brown silt, relatively homogeneous, with rare fine inclusions and organic impregnations.		
230-240	Medium-light greyish brown clayey silt, homogeneous, with plant impressions.		
240-250	Medium grey-brown clayey silt, homogeneous, compact, with rare carbonate granules.	Constructed floors	

Sc4

Depth (cm)	**Description**	**Interpretation**	
0-15	Dark greyish brown silty clay, relatively homogeneous, with rare grains of carbonates and burnt daub.	Modern soil	
15-35	Medium grey-brown silty clay, relatively homogeneous, with rare grains of carbonates and burnt daub.		
35-40	Medium grey-brown silty clay, heterogeneous, with rare mm grains of carbonates and burnt daub.	Colluvium	1
40-50	Light grey-brown silty clay, very heterogeneous, with frequent mm-cm carbonate grains, cm fragments of burnt daub and a mm ceramic fragment.		
50-60	Light gray-medium brown silty clay, heterogeneous, with mm grains of carbonates and burnt daub.		
60-70	Light brown silty clay, heterogeneous, with mm grains of carbonates and burnt daub. A few cm ceramic fragment (fig. 14).		
70-80	Light brown silty clay, heterogeneous, granular, with frequent carbonate grains (10-20%). A cm ceramic fragment (fig. 14).		
80-90	Yellowish brown clayey silt, relatively homogeneous, with rare carbonates.		
90-100	Yellowish brown clayey silt, relatively homogeneous, with rare carbonates and a 1 cm rock fragment.		

100-110	Light greyish-brown clayey silt, granular, heterogeneous, with rare carbonates, bone and charcoal fragments, a cm ceramic fragment (fig. 14), burnt daub granules, mm - cm.	External occupational level	
110-120	Brick brown clayey silt, granular, relatively homogeneous, with abundant grains of burnt daub.	Burnt destruction	3 (D3)
120-130	Brick brown clayey silt, granular, relatively homogeneous, with abundant grains of burnt daub.		
130-140	Light brown clayey silt, granular, heterogeneous, with frequent grains of burnt daub, 1-2 cm.		
140-150	Yellowish brown clayey silt, granular, relatively homogeneous, with frequent grains of burnt daub, 2-3 cm.		
150-160	Light brown clay silt, granular, relatively homogeneous, with frequent grains of burnt daub, 1-4 cm.		
160-170	Medium greyish-brown clayey silt, fine, homogeneous, with rare mm grains of burnt adobe.	Constructed floors	
170-180	Medium gray silty clay, very homogeneous, compact, with fine plant impressions, very rare, mm, granules of burnt daub.	Unburnt destruction	4 (D5)
180-190	Medium gray silty clay, very homogeneous, compact, with fine plant impressions, a cm ceramic fragment (fig. 14).		
190-200	Medium gray silty clay, very homogeneous, compact, with fine plant impressions, without inclusions.		
200-210	Medium gray silty clay, very homogeneous, compact, with fine plant impressions, without inclusions.		
210-220	Medium gray silty clay, very homogeneous, compact, with fine plant impressions and wood fragments.	Constructed floors	
220-235	Medium-dark gray silty clay, very homogeneous, compact, with frequent fine plant prints, without inclusions.		
235-250	Yellowish brown silty clay, very homogeneous, compact, with fine porosity, without inclusions.	Paleosoil on *læss*	

Sc2

Depth (cm)	**Description**	**Interpretation**
0-15	Dark brown silty clay, homogeneous, compact, with rare grains mm of burnt daub.	Modern soil
15-30	Dark brown silty clay, slightly heterogeneous, with rare, mm-cm, grains of carbonates, very rare mm grains of burnt adobe, a cm ceramic fragment (fig. 15).	
30-40	Medium-light brown silty clay, heterogeneous, with rare mm-cm grains of carbonates, coal, and burnt daub.	Colluvium
40-50	Light brown silty clay, heterogeneous, with rare, mm-cm, carbonate grains, a cm ceramic fragment (fig. 15).	
50-60	Light brown silty clay, relatively homogeneous, with very rare mm grains of carbonates and burnt daub.	
60-70	Light brown clayey silt, heterogeneous, with rare carbonates, mm-cm.	Bulwark/barrier/dike
70-80	Yellowish brown clayey silt, slightly heterogeneous, with rare carbonates, mm-cm.	

80-90	Light brown clayey silt, slightly heterogeneous, with rare carbonates, mm-cm.	Bulwark/barrier/dike
90-100	Yellowish brown clayey silt, slightly heterogeneous, with rare mm carbonates, very rare ~1 cm.	
100-110	Yellowish brown clayey silt, relatively homogeneous, with very rare carbonates, generally rounded, 1-5 mm.	
110-120	Light brown clayey silt, relatively homogeneous, with rare, mm, carbonates.	
120-130	Light brown clayey silt, more heterogeneous, with mm carbonate grains, more frequent (1-2%).	
130-140	Medium brown clayey silt, very homogeneous, with very rare anthropogenic constituents, mm.	Paleosoil on *læss*
140-150	Medium brown clayey silt, very homogeneous, with very rare anthropogenic constituents, mm.	

Sc3

Depth cm	**Description**	**Interpretation**
0-15	Dark brown silty clay, homogeneous, compact, with rare, mm, grains of burnt daub.	Modern soil
15-30	Dark brown silty clay, slightly heterogeneous, with rare, mm-cm, grains of carbonates, very rare, mm, grains of burnt daub.	
30-40	Medium-light brown silty clay, heterogeneous, with rare, mm-cm, grains of carbonates, charcoal and burnt daub.	Colluvium
40-50	Light brown silty clay, heterogeneous, with rare, mm-cm, carbonate grains.	
50-60	Light brown silty clay, relatively homogeneous, with very rare mm grains of carbonates and burnt daub.	
60-70	Dark brown silty clay, homogeneous, with very rare and very fine (mm) anthropogenic constituents.	Filling of the boundary ditch
70-80	Dark brown silty clay, homogeneous, with very rare, very fine anthropic constituents – a few mm grains of burnt daub.	
80-90	Dark brown silty clay, homogeneous, with very rare, very fine (mm), anthropogenic constituents.	
90-100	Dark brown silty clay, homogeneous, with very rare, very fine (mm), anthropogenic constituents.	
100-200	Dark brown silty clay, homogeneous, with very rare, very fine anthropic constituents, mm, a ceramic fragment cm (fig. 16).	
210-220	Silty clay, very plastic, yellowish brown, very homogeneous, with rare mm grains of burnt daub.	
220-230	Silty clay, yellowish brown, homogeneous, with mm grains of burnt daub and carbonates, very rarely ~1 cm.	
230-240	Silty clay, yellowish brown, relatively homogeneous, with rare, mm, grains of burnt daub, a ceramic fragment, cm (fig. 16).	
240-250	Silty clay, yellowish brown, very homogeneous, with rare, mm, grains of burnt daub.	