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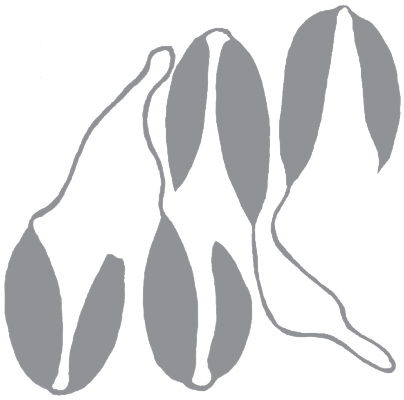

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The manufacture of lime on the Budureasca Valley (Prahova County) by late medieval and early modern period[1]

Bogdan Ciupercă, Andrei-Cătălin Dîscă, Tudor Hila, Andrei Măgureanu

Abstract: During the medieval and modern periods, in the area south and east of the Carpathians, the manufacture of lime, closely related to the emergence and diffusion of masonry architecture, is commonly associated with military fortifications, bourgs, towns and ecclesiastic centres. Nevertheless, research carried out in recent years on the Budureasca valley record the presence of this craft in a rural setting as well, in a relatively peripheral area compared to main trade and communication routes. In 2006 and 2020, via the archaeological excavations conducted on said valley were investigated two lime firing kilns, which most likely date by late medieval and first part of the modern era.

Keywords: lime kilns; Budureasca valley; medieval period; modern period; archaeological excavations.

At 13 km north-west the Mizil town, by the foothills of the first Sub-Carpathian hills, on the territory of Vadu Săpat, Fântânele and Călugăreni communes lies Budureasca valley. This narrow valley, with rather steep slopes is crossed from north to south by the namesake stream. The stream's flow direction made that the valley was easily accessible from the south, while from northwards, eastwards and westwards, access was much hindered by certain hills present, whose tops frequently exceed 400 m, being practically a true natural stronghold with the appearance of an amphitheatre (Fig. 1).

The hills set on both sides of the stream, on a ca. 10 km² stretch, are punctuated by high, well individualised terraces divided by ravines, representing a propitious habitat for small human communities. Humans became aware of these advantages rather early, high inhabitancy density being noted in the area, with 31 sites being documented to date and inhabitancy levels from the upper Palaeolithic to the modern age[2]. Research of these sites was initiated in 1959 by archaeologist Victor Teodorescu, after Nicolae Divoiu of Vadu Săpat ("uncle Nae") reported to the museum in Ploiești the find of certain clay pots from the point "La Hulă" (Budureasca 7), subsequent to certain landslides that had occurred in the area.

If in 1959, landslides "facilitated" the emergence of said finds, on long term, this phenomenon, together with those of soil erosion and terrace collapsing, is a constant threat for the archaeological remains in the area. For this reason, yet also because the density and diversity of the remains, from that date to the present, the area was systematically investigated by the Prahova County Museum of History and Archaeology. These approaches were mainly focused on the study of the settlements belonging to the Ipotești-Cândești culture (the 5th–7th century AD) and of Getae features, however assemblages dated to the Palaeolithic, Neolithic, the Bronze Age, the Iron Age and the medieval period were also investigated.

The medieval date finds, clustering mainly in Budureasca 6 – *Brănești* and Budureasca 8 – *La Silițe* archaeological sites, yet in also other like Budureasca 4, 5, 7, 10, 16 and 23, are indicative of existent settlements in the area. These data are further confirmed by written sources, since by late 16th century, documents mention there the villages of Budurești, Brănești and Brăgărești[3]. Amongst, in the 17th

[1] This study was drawn up within project „Peisaje ascunse: explorarea prin teledetecție și LIDAR a drumurilor, granițelor și câmpurilor de luptă din Carpații de Sud-Est" (abbreviated: HiLands*)(Hidden landscapes: exploring by remote-sensing and LIDAR roads, borders and battle fields in the South-East Carpathians)*, code PN-III-P4-ID-PCCF–2016-0090, funded by the Executive Unit for Funding Higher Education, Research, Development and Innovation (UEFISCDI), during 2018–2022. English translation: Gabriela Safta.

[2] Teodorescu, Peneș 1984, 11–50.

[3] DRH-B, XI, 403; DRH-B, XXI, 198, 227, 243; DRH-B, XXII, 10, 169; DRH-B, XXV, 60, 262; DRH-B, XXXVII, 51, 60, 61, 174, 197.

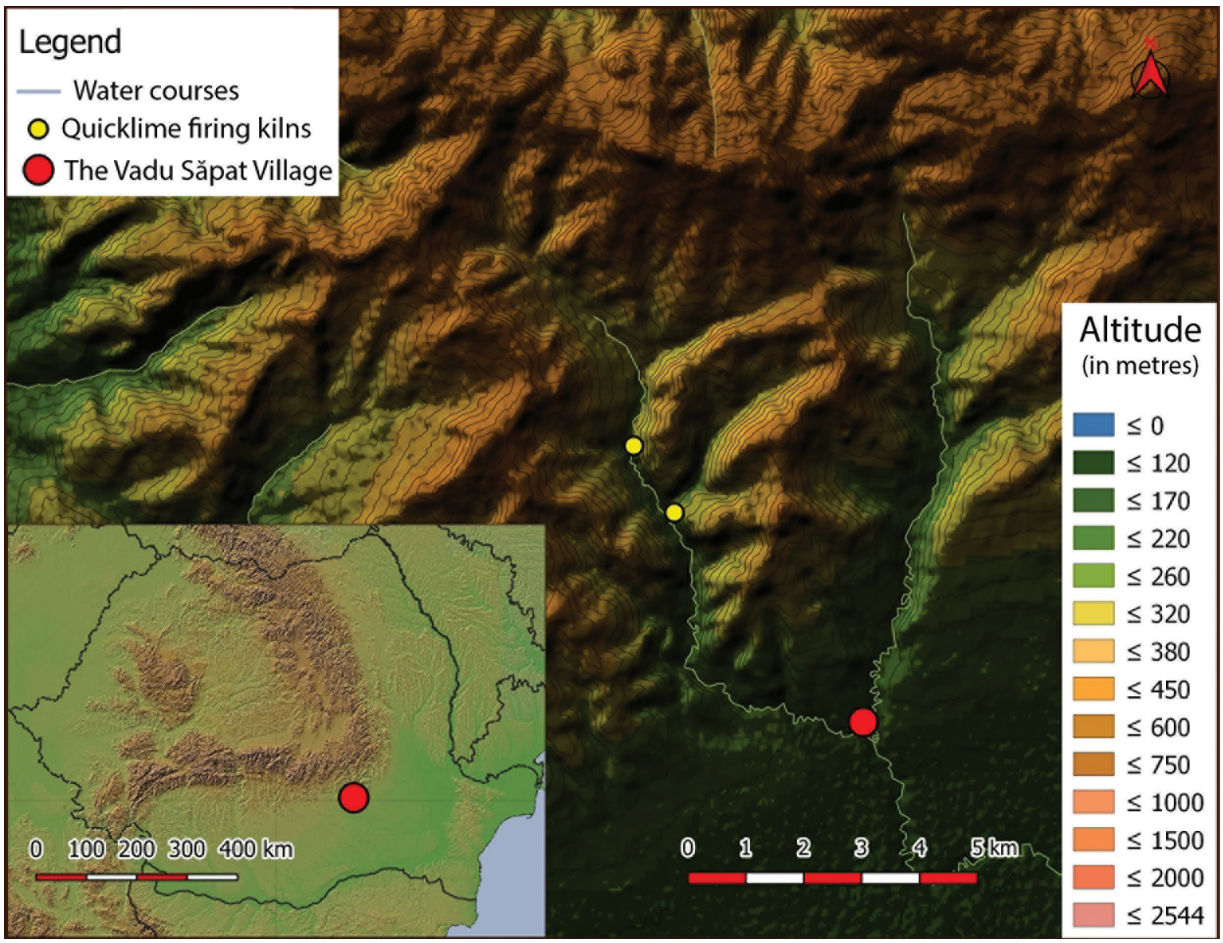

Fig. 1. Location and topography of the Budureasca Valley (digital elevation model).

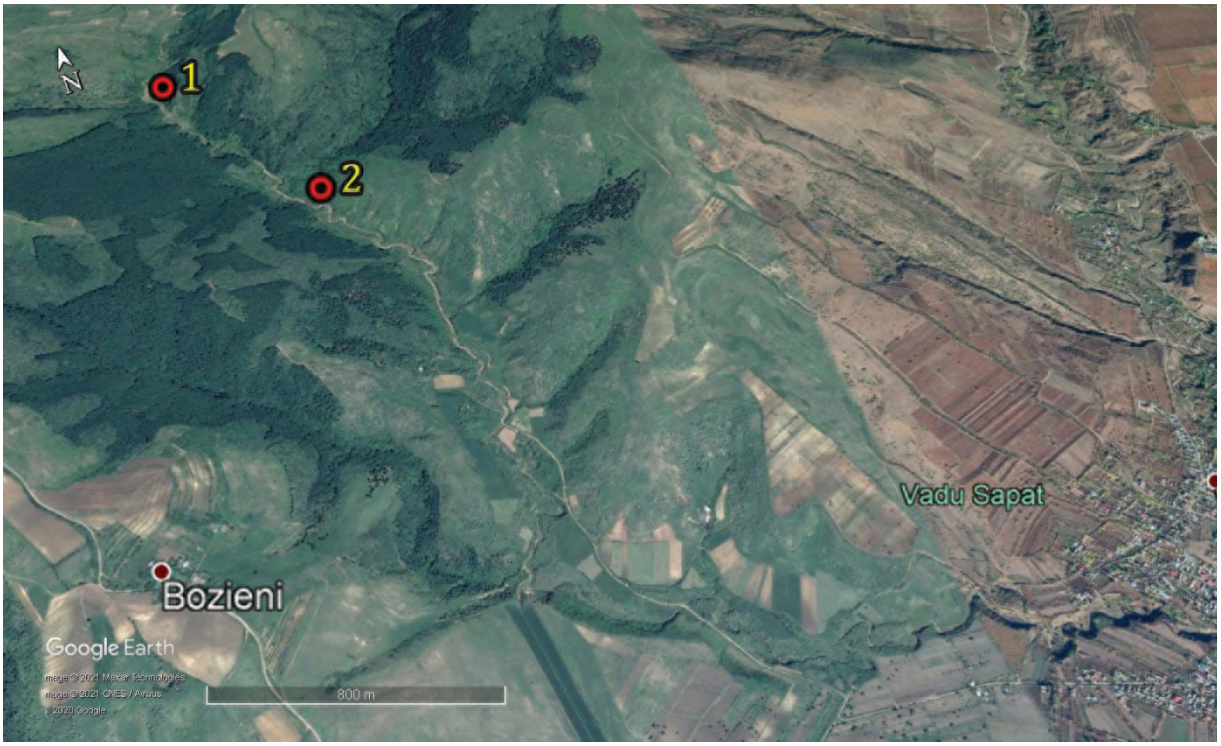

Fig. 2. Lime firing kilns investigated on the Budureasca valley: 1. The archaeological feature excavated in 2020; 2. The archaeological feature excavated in 2006.

century documents, the most frequently reported is Brănești, squires, priests, court marshals and porters being mentioned there. The reason for which Budurești is rarely mentioned is possibly due the fact that it was a village of serfs, as recorded by a 1627 document[4].

As of the 18th century, at Brănești is also mentioned a monastery[5], recorded in 1790 also on the first Austrian survey of the Wallachia under label "Mon. Braniaska" (Pl. 1/1). According to all indications, once with the emergence of above villages and the Brăneasca monastery also develops the lime manufacture craft in the Budureasca Valley by late medieval period and early modern age. In the period, lime manufacturing is regularly associated, in the Romanian Principalities, with military fortifications, bourgs, towns and ecclesiastic centres[6]. Such association is explained by the fact that lime is a key element in the sector of masonry constructions, however this product was also used in other activity fields like for instance in agriculture for soil improvement and as plant nutrient[7], in the leather industry, for the tanning process, in traditional medicine, as ingredient in various traditional remedies or even in the food industry, the Romans using it, for instance, to obtain counterfeit wine[8].

Lime is not a naturally occurring mineral, being obtained only by firing calcium carbonate ($CaCO_3$ – called lime or limestone in folk terms), in a kiln, at certain temperatures for several days. Calcium oxide (CaO), colloquially termed quicklime is obtained subsequent to this process. By mixing calcium oxide with water, slaked lime or calcium hydroxide [$Ca(OH)_2$][9] is obtained, material used in construction works both as binding agent or decoratively, for finishes[10].

In the Budureasca valley, lime production is not recorded by written documents or local traditions, however, the practice of this craft is confirmed by the presence of limestone firing kilns, two installations of the sort being archaeologically investigated (Fig. 2). The first, located in the central area of the valley, on its left side, at *Budureasca 6 – Brănești*, was excavated in 2006, while the second, lying towards the north of the valley, still on its left side, north the *Budureasca 9 – Puțul lui Burciu* archaeological site, in 2020.

The kiln investigated in 2006 was identified on the northern bank of a cart track climbing from the Budureasca riverbed to the terrace on which the medieval village of Brănești[11] had developed (Fig. 2/2; Fig. 3). During heavy rainfalls, this road behaves like a true gush collecting waters from the surrounding slopes and the Brănești terrace and directs them to the river. Such natural phenomena cause bank collapses and landslides in the area, which most often reveal various remains or artefacts. It was this way that said feature was brought to light, interpreted firstly as a fire installation belonging to a 5th–7th AD century house (kiln recessed in the wall of a sunken house).

Fig. 3. Location of the kiln investigated in 2006.

4 DRH-B, XXI, 198.
5 AJTR 1775–1781, 300, 731, 785.
6 Ionescu 1982, 382–385.
7 Kuhlmann 2001, 275–295.
8 Dix 1982, 341.
9 Geyssant 2001, 2.
10 Dix 1982, 341.
11 Geographical coordinates: 45°3'35.03"N, 26°21'25.87"E.

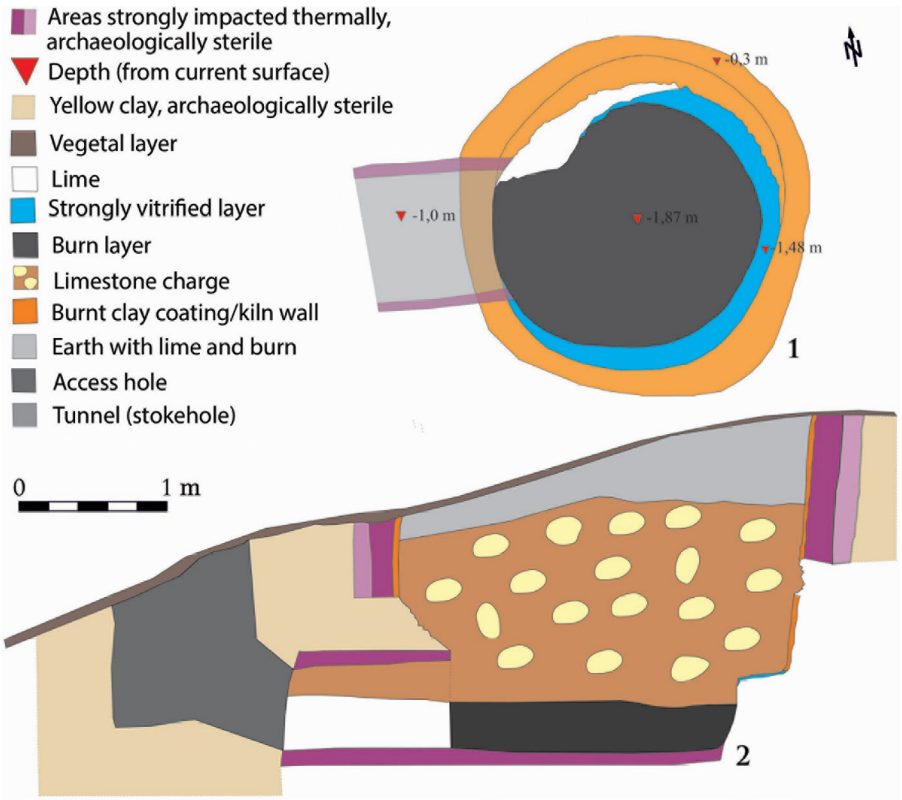

Fig. 4. The kiln excavated in 2006: 1. plan; 2. profile.

A circular flat structure was evidenced as the archaeological excavations advanced, with a maximum diameter of 2.40 m and maximum surviving depth of –2.50 m from outline level, the kiln volume being over 6.50 m^3 (Fig. 4; Pl. 2). The stoking tunnel, which ensured the necessary combustion for firing the limestone and thus, for obtaining quicklime was identified at –1 m deep from the outline level. Access to the approximately 1.20 m long tunnel and a stokehole with a maximum diameter of 0.60 m was made via a hole excavated in the hill's slope. Beneath the stoking tunnel, at approximately –1.60 m from the outline level, inside the kiln chamber, was noted a strongly slagged step, with a width varying between 0.20 and 0.40 m, whose role was to support the stone pile out of which quicklime would be obtained by firing. Another element which likely was also aimed to support the stone pile is the groove emerging at approximately 0.40 m above the slagged step and –1.20 m from the outline level, in the preserved kiln wall. A "grill", which overtook part of the load from the upper kiln side was likely set in this groove. In the lower part of the stoking tunnel, yet also in the north-west part of the kiln chamber, were noted considerable lime depositions. On the interior of the kiln chamber walls was noticed a strongly burnt clay lining, ca. 0.10 – 0.12 m thick. In certain areas nearby the kiln walls, the thickness of the layer affected by the thermal diffusion process reached even 0.40 m. The thickness of these layers and presence inside the installation of a significant quantity of lime are arguments that endorse the idea that several charges of limestone were fired in this kiln in order to obtain quicklime. In fact, at the time of the investigation, the kiln was already filled with limestone rocks, being likely prepared for a new charge that could no longer be completed, the installation being abandoned.

The kiln investigated in 2020 was identified in the bank of Budureasca stream, where following the marked soil erosion process there could be noted the remains of an archaeological feature which represented either an iron ore reducing kiln or one for the production of quicklime[12] (Fig. 2/1, Fig. 5). A 2.70 × 3.80 m trench was excavated in order to identify the kiln in plan. The thickness of the vegetal layer was of ca. 0.50 m; underneath, there was a sandy yellowish-gray layer without archaeological materials, resulted from landslides from the terrace's natural slope. The upper kiln part was noted in plan at ca. -0.70 – 1.10 m deep from the surface level (the difference being given by the terrace's sharp slope, the depth from topsoil being smaller streamwise and higher hillwards). Very likely, the

[12] Geographical coordinates: 45°4'0.60"N, 26°21'3.60"E.

Fig. 5. Kiln investigated in 2020 after cleaning the naturally created profile by the terrace collapse.

installation was originally oval flat, however, because its riverside part was destroyed by landslides, at the time of research the still surviving part was half-oval flat. The maximum diameter of the kiln upon outline was of approximately 3.20 m (Fig. 6/2). At approximately -0.15 m from outline level was identified an assemblage of river stones which most likely represented an incomplete charge (Pl. 3/1). Beneath this level, on the southern side, at -0.75 m deep from the outline level, was identified the stoking tunnel, approximately 1 m long. Below, at –1.10 m deep was also found the stokehole, with a diameter of 0.40 m. At approximately –1.60 m from the outline level, inside the kiln chamber, was noted a strongly vitrified step, with a width varying between 0.20 and 0.30 m, supposed to support the stone pile of which quicklime would be obtained by firing. By the kiln base was found a compact burning and charcoal layer, 0.03 – 0.05 m thick. The maximum depth of the feature was of –1.90 m from outline level, the kiln volume being over 8.50 m^3 (Fig. 6/1; Pl. 3/2). On kiln edges was noted a layer of approx. 0.12 – 0.15 m of strongly burnt clay lining. Large lining pieces, likely detached from the upper kiln part were found in the filling inside. Beside the lining pieces, inside the kiln were also discovered several animal bones and an atypical shard, small in size. In the stokehole and stoking tunnel area there laid a large quantity of quicklime, likely resulted from previous charges. Outwards, nearby the walls was evidenced a layer of thermal diffusion, 0.14 – 0.15 m thick, resulted from sideway air escapes during the firing process[13].

How these kilns operated may be established by reference with other similar cases, investigated either by archaeological excavations or ethnographic inquiries. Currently available data indicate that the two kilns examined on the Budureasca valley belong to the class of sunken kilns, among the kilns where quicklime was traditionally produced also counting the types built on the surface[14]. The sunken kilns may at their turn have their walls reinforced with river stones or clay[15]. In the 19th century and early 20th century, the sunken kilns from the region of Wallachia and Lesser Wallachia had stone walls, areas where sunken kilns had clay coated walls being mentioned only in the Apuseni Mountains and Dobruja[16].

[13] Maier 2008, 76.
[14] Goman 2001–2003, 62.
[15] Maier 2008, 69–74.
[16] Maier 2008, 70–74, 79.

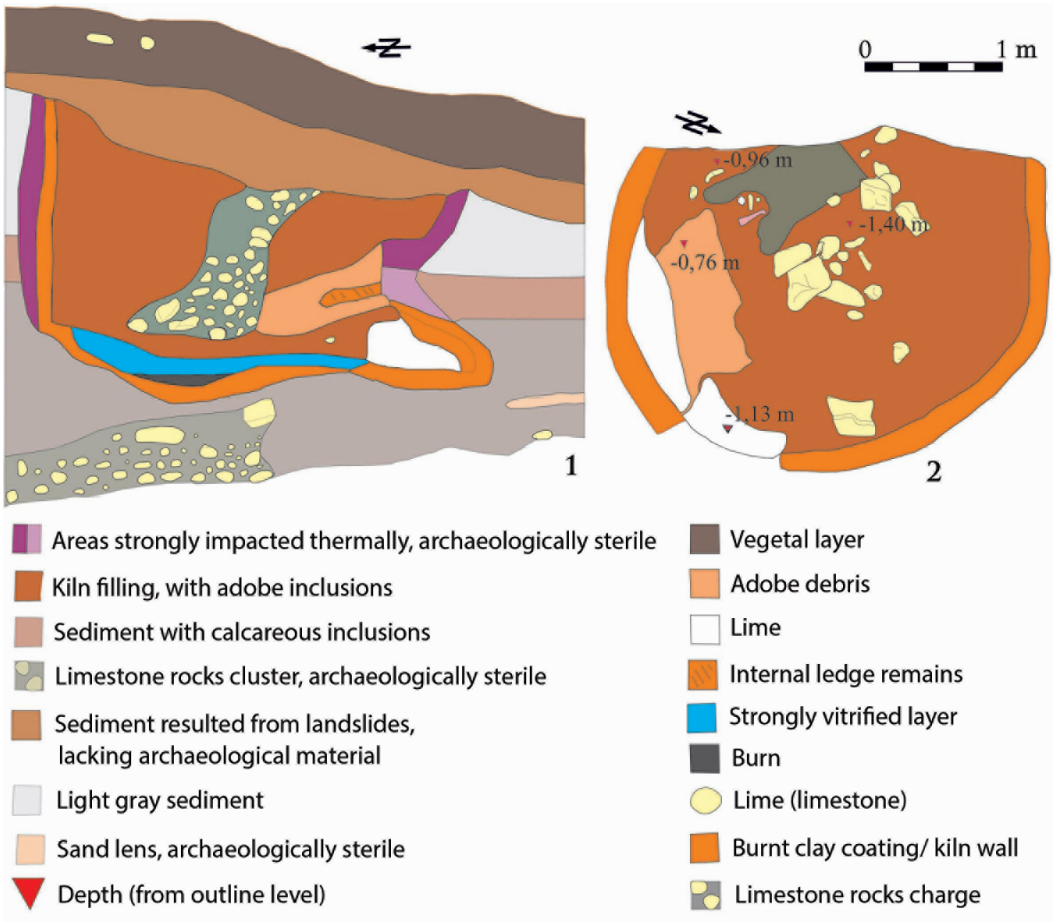

Fig. 6. The kiln investigated in 2020: 1. profile; 2. plan.

According to kiln types and local traditions, the constructional elements of a kiln may be slightly different, however, there is a series of parts invariably found with a *varniță (Romanian regional term for kiln*). Amongst count: the combustion chamber or *căldare*, *tigaie (Romanian regional terms for combustion chamber*), where the fire burnt, the stokehole (by where the kiln was fuelled), the part by which was removed, the internal ledge (*tălpile camniței*, *pomnori* or *pomnol*, *părcan, Romanian regional terms for the internal ledge)*, where the stone begins to be piled up (this part, which measures around 30 cm high and 30 cm wide, is set by the base of the internal kiln walls, less where the stokehole for fuelling and ash removal lay) and the kiln head (where the limestone is inserted and quicklime is removed)[17].

Regardless the used kiln type, the obtaining process of quicklime was reduced, essentially, to limestone firing. Subsequent to such firing, the thermal dissociation reaction following which limestone changed into lime balls occurred. So that the thermal dissociation reaction take place, it was necessary that firing be maintained for several days at temperatures comprised between 900 and 1100˚C[18].

A series of logistical operations intended for the entire production chain, starting from procurement of raw materials to kiln emptying, were required in order to reach these parameters. The main phases of this process may be resumed as follows: 1) kiln construction, 2) limestone procurement, 3) fuel supply, 4) limestone rocks piling up inside the kiln, 5) limestone firing and 6) kiln emptying[19].

Above phases are interrelated and must be planned in such a manner that a series of requirements of which the end result of the production process depends, would be completed. Thus, the kiln had to be built in such a manner it could be easily loaded and emptied, it was supposed to have sufficiently stable walls in order to support the load, withstand fire action and limit thermal energy loss[20]. Limestone

17 Goman 2001–2003, 63–64; Maier 2008, 67.
18 Dix 1982, 335–356.
19 Goman 2001–2003, 53–73.
20 Fourcroy de Ramecourt 1766, 65–66, Pl. VII, Fig. 22–23.

procurement had to be made from sources with a minimum 95% calcium carbonate content[21]. Fuel supply had to take into account the fact this process involved much energy consumption, an average of 2.5 cubic meters of wood being necessary per a limestone ton[22]. Piling up the limestone inside the kiln had to be made in such a manner that it would not collapse onto the kiln hearth. For this reason, often, the stones on the internal ledge were laid in the form of a dome on top of the kiln hearth, while the limestone rocks from the upper side were laid in such a manner that the pressure would be transferred to the kiln walls and less to the dome. So that the air and fire could circulate inside the kiln it was very important that the limestone rocks be spaced out[23]. An ideal illustration of how a charge had to be laid in the kiln and how the limestone firing occurred is found in a work published by Ch.-R. Fourcroy de Ramecourt in 1766[24] (Fig. 7). The limestone firing could last, depending on kiln type, used fuel and local traditions, between two and seven days. In general, in a first phase little fire was lit so to dry the dome, after which, gradually, more wood was inserted to heat the kiln that would burn ceaselessly until the last day. It was generally believed that firing was completed when both the limestone inside the kiln and the flame on its surface whitened[25]. The kiln was emptied after the charge cooled, usually at 1–2 days after the fire was put out. Often, during this operation, part of the kiln (the back wall in the case of surface kilns or the stokehole in the case of sunken kilns) was purposefully demolished in order to reduce the made effort, this part being later remade for the following charge[26].

The places where limestone firing kilns were commonly set up lay in the vicinity of raw material sources, most often sloping (mainly the sunken kilns), by access roads, with the stokehole directed towards the valley[27]. Another important criterion was the existence nearby of firing wood sources[28].

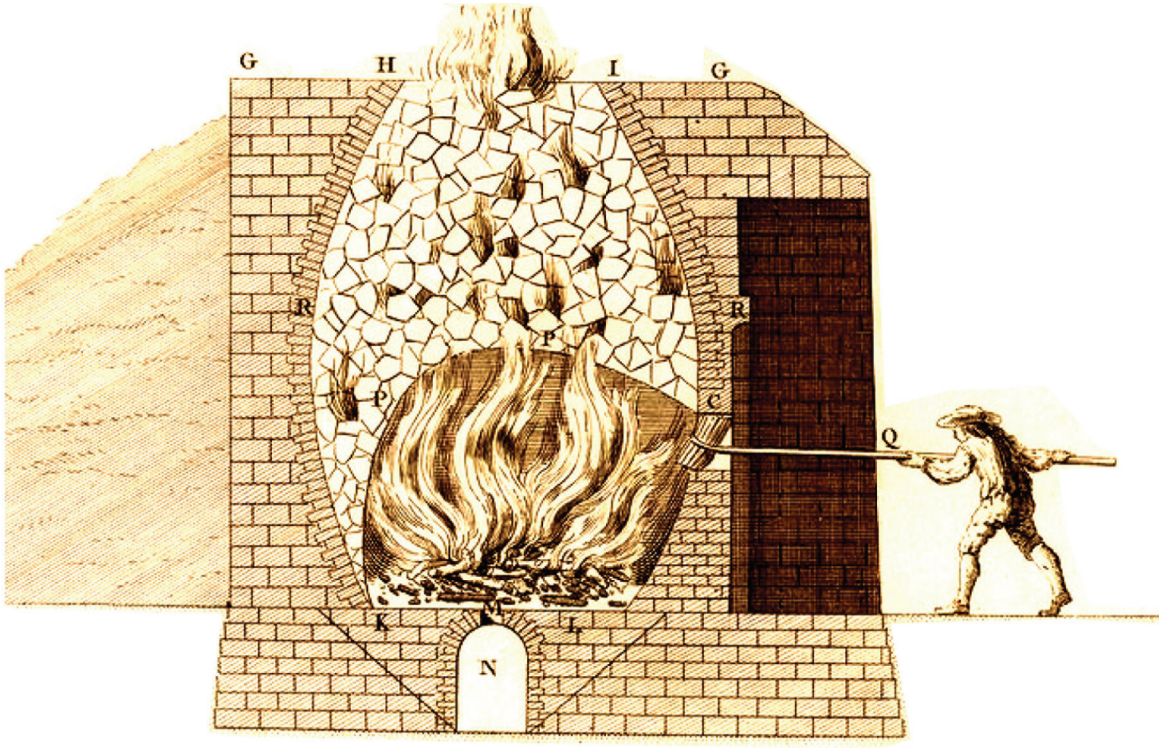

Fig. 7. How a lime firing kiln operated – after: Fourcroy de Ramecourt 1766, Pl. VII, Fig. 23.

From the above presented, it may be argued that the location of these two kilns on the banks of the Budureasca stream is due on one hand, to the abundant presence on this valley of the raw material

[21] Goman 2001–2003, 64.
[22] Goman 2001–2003, 64; Зозулин 1864, 250–256, apud Vornic *et al.* 2019, 241.
[23] Goman 2001–2003, 64; Зозулин 1864, 250–256, apud Vornic *et al.* 2019, 241.
[24] Fourcroy de Ramecourt 1766, Pl. VII, Fig. 23.
[25] Goman 2001–2003, 70–73; Зозулин 1864, 250–256, apud Vornic *et al.* 2019, 240–241.
[26] Goman 2001–2003, 73.
[27] Goman 2001–2003, 62; Maier 2008 67.
[28] Goman 2001–2003, 71; Maier 2008, 88.

necessary for obtaining quicklime and on the other, to an existing social-economic context when this product was demanded.

The discussed valley is practically covered with limestone blocks in secondary location[29] (Pl. 4/2), carried there by gushes from primary Sarmatian deposits (formed of oolitic limestone, calcareous marls, limestones, sands and clays) cropping out on the crests from the northern limit of the valley, on the territory of Podgoria and Tătaru villages[30] (Pl. 4/1).

The social-economic context in which a product like quicklime was requested on the Budureasca Valley was likely linked to the Budurești, Brănești and Brăgărești villages and to the Brăneasca monastery over the course of the 17th century and the 18th century, when the settlements on this valley are most frequently recorded in documents[31]. In the period, owing to relative improvement of the economic conditions in Wallachia, part of boyar households, ecclesiastic buildings and central shops begin to be stone built, according to certain art style and in appreciable sizes[32]. In the period begin also to multiply the data on lime production and its trade. The first lime production installations of the medieval period documented to the south and east of the Carpathians date from the start period of the Romanian medieval states. Best known examples are those of Șcheia[33] and Suceava, where several large kilns dating from the 14th century to the 17th century[34] were researched. In Wallachia, nearby the princely court of Târgșorul Vechi were investigated eight sunken kilns, which most likely date to the second half of the 15th century or over the 16th century[35]. In the Republic of Moldova, in the former town of the Golden Horde, Orheiu Vechi[36] and Costești – Gârlea, several sunken quicklime kilns dated to the 14th century[37] were researched. More recently, in the Olt Gorge, at Racoș, in a ca. 3 km diameter area were identified 75 LIDAR anomalies interpreted as limestone firing kilns dating likely between the 17th and 20th century[38].

Still from the 17th century start to emerge in Wallachia the first written mentions regarding quicklime. Such a document from the end of the century records the quarry of Măglași (Vâlcea county), from where a significant quantity of limestone was quarried for the construction of the Hurezi monastery[39]. These documents multiply over the following century, especially in the counties of Dâmbovița, Prahova and Saac[40].

The settlements on the Budureasca valley also belonged to the latter during the medieval and first part of the modern age, the Saac or Săcuieni county ceasing to exist on the 1st January 1845 when it was administratively abolished, while its territory was divided between the counties of Prahova and Buzău[41].

As available documents seem to show, the area undergoes a series of profound changes in terms of settlement development during the modern period. Thus, out of all settlements on the Budureasca valley mentioned in the introductory part of this study, by late 18th century, only Budurești is still mentioned by sources[42], while at Brănești only a monastery is still documented[43]. The monastery is represented in 1790 on the first Austrian survey of Wallachia under label "Mon. Braniaska" (Pl. 1/1). The depopulation trend of the Budureasca valley further continued over the 19th and 20th century.

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[29] Geological deposits may be classified (depending on the geomorphologic processes) in primary deposits (located in forming rock), secondary (located nearby primary deposits, are formed by erosion) and residual and allochthonous (alluvial depositions carried to great distances by rivers); Van Andel, Runnels 1995, 481–500; Turq 2000, 106–107; Turq 2005, 111–132.

[30] Săndulescu *et al.* 1968, 28–29.

[31] DRH-B, XI, 403; DRH-B, XXI, 198, 227, 243; DRH-B, XXII, 10, 169; DRH-B, XXV, 60, 262; DRH-B, XXXVII, 51, 60, 61, 174, 197; AJTR 1775–1781, 300, 731, 785; Bawr 1778, 127; Zaharescu 1922, 147–173.

[32] Ionescu 1982, 382–385.

[33] Diaconu, Constantinescu 1960, 20–21; 51–64.

[34] Nestor *et al.* 1957, 239–278; Nestor *et al.* 1959, 593–618.

[35] Novel research; inf. A. Măgureanu and B. Ciupercă.

[36] Postică 2006, 125–133.

[37] Vornic *et al.* 2019, 236–240.

[38] Ștefan *et al.* 2021.

[39] Iorga 1907, 254–255.

[40] Maier 2008, 22–24.

[41] Zaharescu 1922, 163.

[42] Bawr 1778, 127; Zaharescu 1922, 147–173.

[43] AJTR 1775–1781, 300, 731, 785.

Thus, if in the first part of the 19th century on both the left and right side of the Budureasca valley still existed several buildings and households, as shown on the surveys performed just after the half of the 19th century[44] (Pl. 1/2), by early 20th century, there were none in existence as it results from the military plans drawn up in the first half of this century[45]. Very likely, in the second half of the 19th century the area ceases to be inhabited, as it may be inferred from the fact that *Marele Dicționar Geografic al Romîniei*[46] (*Great Geographical Dictionary of Romania*) mentions Budureasca only as a brook which "springs from the Călugăreni commune range, crosses by the Vadul-Săpat commune, pl. Cricovul, Prahova County, continues its course in the vicinity of the Mizil commune, Buzău county, after having received brook Scheianca as its tributary. On this valley, there is little building stone". Approximately the same information is found about Budureasca also in the work *Dicționar geografic al județului Prahova*[47]*(The Geographic Dictionary of Prahova County)*, while Brănești or Brăgărești are not mentioned in any of the works. According to V. Teodorescu, the last mention on the Budureasca village dates to 18th April 1886 when "C. Negulescu of Fântânelile" gifts a missal to the church of "Budureasca, Vadu Săpat commune"[48].

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[44] http://charta1864.gis-it.ro/essay.html.
[45] http://geo-spatial.org/harti/#/viewer/openlayers/10.
[46] Lahovari *et al.* 1899, 50.
[47] Brătescu *et al.* 1897, 83.
[48] Teodorescu, Peneș 1984, 12.

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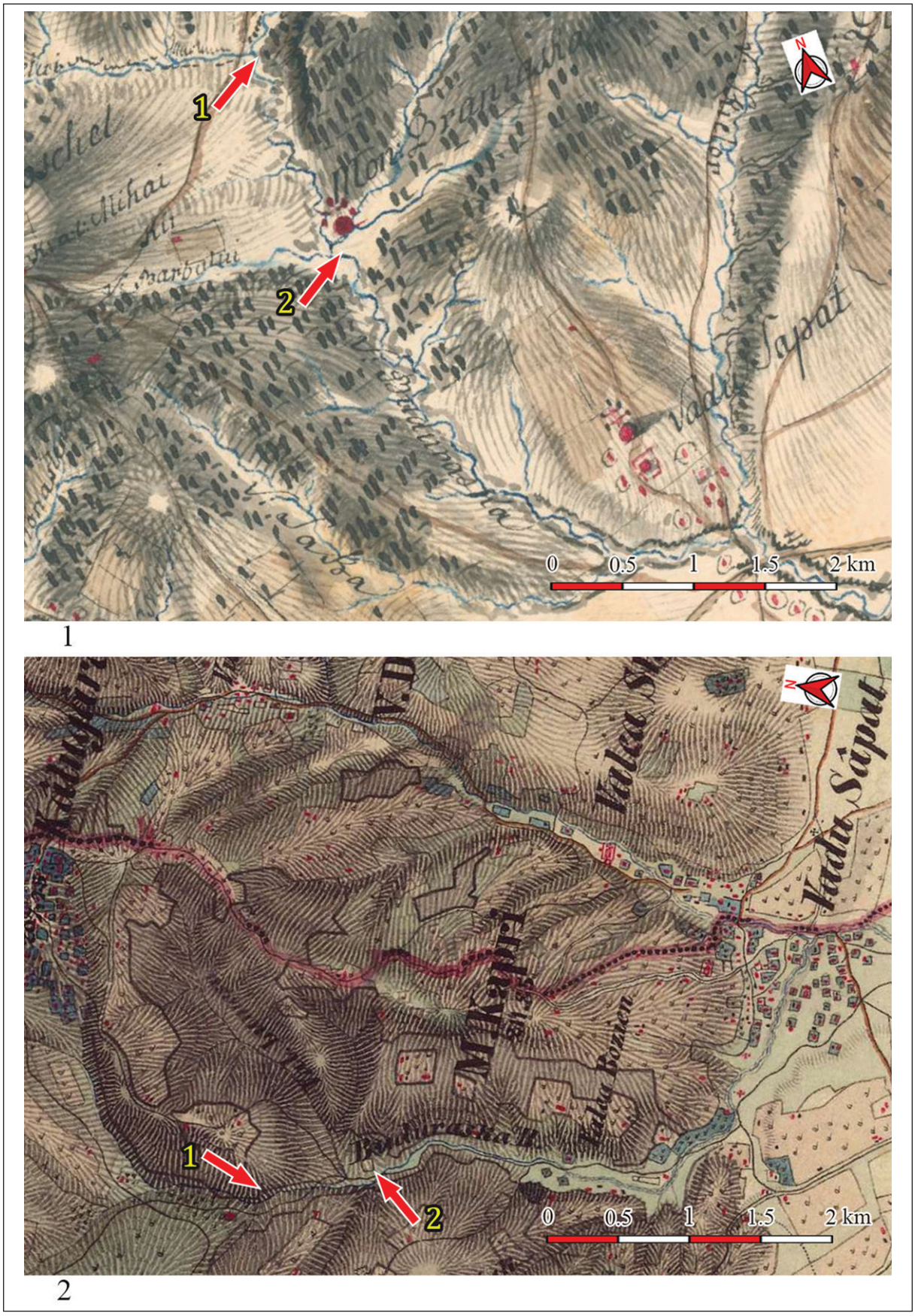

Plate 1. Location of the two investigated kilns: 1. On the first Austrian survey of Wallachia; 2. On the second Austrian survey of Wallachia.

1

2

Plate 2. The kiln investigated in 2006: 1. Upon identification; 2. After the earth removal.

Plate 3. The kiln investigated in 2020: 1. Image during excavation; 2. After the removal of the earth.

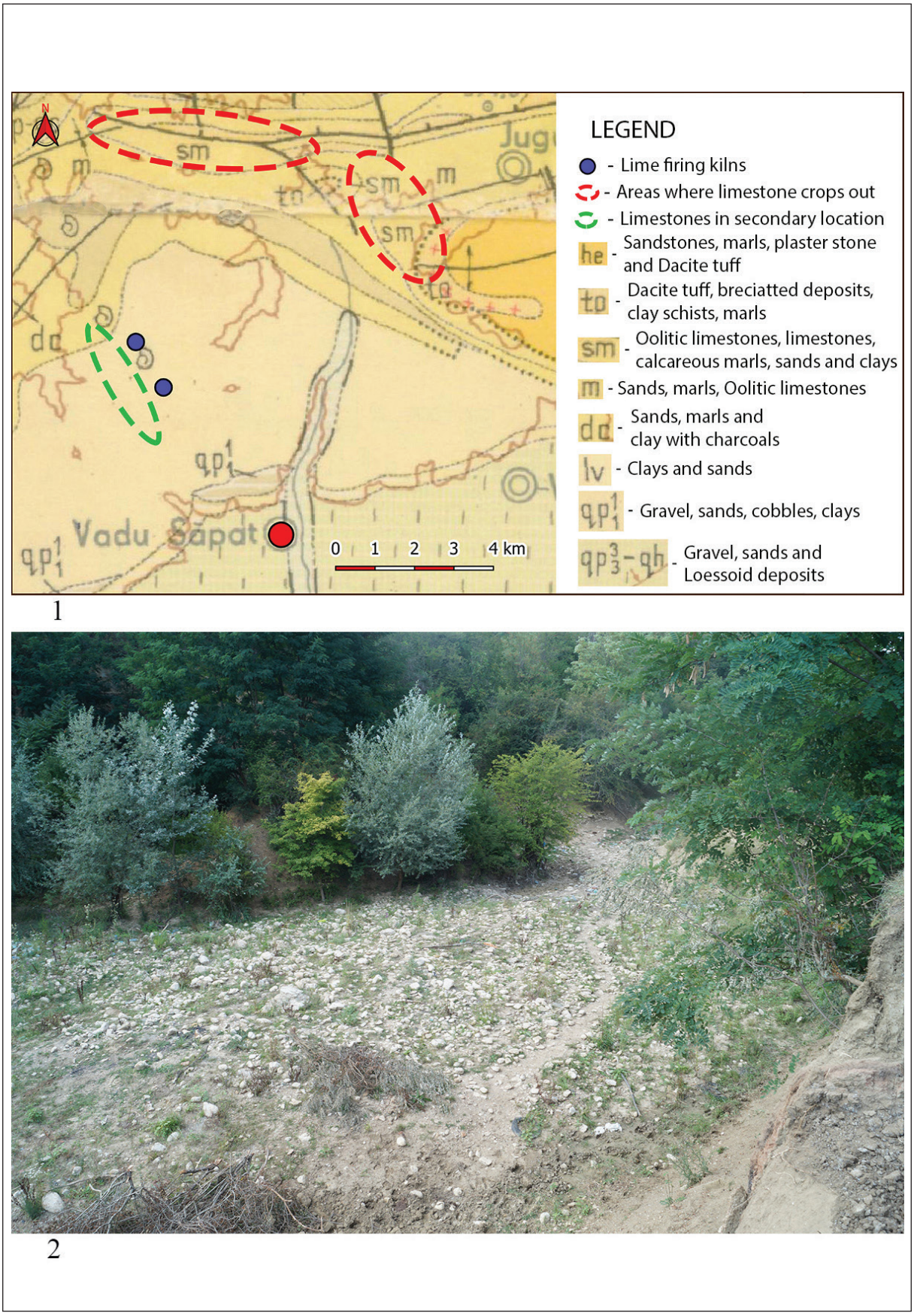

Plate 4. 1. The limestone rock present in Budureasca valley: 1. Limestone sources after *The Geological Map Romania Scale 1:200.000*, 1968; 2. Limestone boulders in secondary location in the stream's dried bed.

Abbreaviations

AEM	Archäologisch-epigraphische Mitteilungen aus Österreich-Ungarn, Vienna.
AM	Arheologia Moldovei, Iași.
AMN	Acta Musei Napocensis, Cluj-Napoca.
AMP	Acta Musei Porolissensis, Zalău.
AMV	Acta Musei Varnaensis, Varna.
Angustia	Angustia. Revista Muzeului Național al Carpaților Răsăriteni, Sf. Gheorghe.
Anuarul MJIAP (S.N.)	Anuarul Muzeului de Istorie și Arheologie Prahova, Serie Nouă, Ploiești.
Antiquity	Antiquity. A review of world archaeology, Durham.
Archaeological Journal	Archaeological Journal. New Series. Chișinău.
ArchÉrt	Archaeologiai Értesitő, Budapest.
ArchPol	Archaeologia Polona, Warsaw.
ArchRozhledy	Archeologické Rozhledy, Praha.
ASM	Archaeologica Slovaca Monographiae, Bratislava.
BAR (Int. S.)	British Archaeological Reports (International Series), Oxford.
Biharea	Biharea. Culegere de studii și materiale de etnografie și artă, Oradea.
BMG	Bibliotheca Musei Giurgiuvensis, Giurgiu.
BMJT	Buletinul Muzeului Județean Teleorman. Seria Arheologie, Alexandria.
BMM	Bibliotheca Musei Marisiensis, Târgu Mureș.
Budapest Régiségei	Budapest Régiségei Régészeti és Történeti Évkönyv. Budapest.
CA București	Cercetări arheologice în București, București.
CCA	Cronica Cercetărilor Arheologice, București.
CIL	Corpus Inscriptionum Latinarum, Berlin.
CsSzMÉ	A Csíki Székely Múzeum Évkönyve. Csíkszereda.
Dacia (N.S.)	Dacia. Revue d'archéologie et d'histoire ancienne. Nouvelle serie. Bucureşti.
Dolgozatok	Dolgozatok a Magyar Királyi Ferencz József Tudományegyetem Archaeológiai Intézetéből. Szeged.
EphNap	Ephemeris Napocensis, Cluj-Napoca.
Erdély	Erdély. Turistai, fürdőügyi és néprajzi folyóirat, Cluj-Napoca.
FontArchPrag	Fontes Archaeologici Pragenses, Prague.
Földtközl.	Földtani közlöny, Budapest.
HOMÉ	A Herman Ottó Muzeum Évkönyve, Miskolc.
ILD	C. C. Petolescu, *Inscripții latine din Dacia*, Bucharest 2005.
JAHA	Journal of Ancient History and Archaeology, Cluj-Napoca.
Jahrb. RGZM	Jahrbuch des Römisch Germanischen Zentralmuseums zu Mainz, Mainz.
JAMÉ	Jósa András Múzeum Évkönyve, Nyiregyháza.
Karpatika	Karpatika, Uzhorod.
LMI	List of Historic Monuments, updated 2015.
Marisia	Marisia. Studies and Materials. Archeology. Târgu-Mureș.
MCA (S.N.)	Materiale și Cercetări Arheologice Serie Nouă. București
MemAntiq	Memoria Antiquitatis, Piatra Neamț.
NNA	Nordisk Numismatisk Årsskrift, Stockholm.
PAS	Prähistorische Archäologie in Südosteuropa, Rahden/Westf.
PAT	Patrimonium Archaeologicum Transylvanicum, Cluj-Napoca.
Paléo	PALEO – Revue d'archéologie préhistorique, Les Eyzies-de-Tayac-Sireuil.
Pallas	Pallas. Revue d'études antiques, Toulouse.

PNAS	Proceedings of the National Academy of Sciences of the United States of America, Washington.
PZ	Prähistorische Zeitschrift. Berlin.
RAN	National Archaeological Repertory.
RM	Revista Muzeelor, București.
Sargetia	Sargetia. Acta Musei Devensis, Deva.
SatuMareSC	Satu Mare Studii și Comunicări, Satu Mare.
SCIV(A)	Studii și Cercetări de Istorie Veche și Arheologie, București.
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SlovArch	Slovenská archeológia, Nitra.
SP	Studii de Preiostorie, București.
St.Cerc.Antropol.	Studii și Cercetări de Antropologie, București.
StudUBB-G	Studia Universitatis Babeș-Bolyai. Seria Geologia, Cluj-Napoca.
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