

# EXPERIMENTAL CONSIDERATIONS ON THE PAINTING TECHNIQUES OF LUMEA NOUĂ POTTERY

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**Abstract:** The cultural group Lumea Nouă is defined by a painted pottery firstly documented at the mid of the last century following the archaeological excavations from the eponymous settlement from the north of Alba Iulia town. The specific pottery inventory comprises vessels of small or medium dimension painted, before burning, with different tones of red on a white or cream-coloured background. Our work presents an experimental approach to reconstructing the painting techniques identified by the analysis of archaeological pottery.

**Keywords:** Neolithic, Lumea Nouă, pottery, painting, pigments, experiments

The cultural group Lumea Nouă is defined by a painted pottery firstly documented at the mid of the last century following the archaeological excavations from the eponymous settlement from the north of Alba Iulia town<sup>1</sup>. Subsequent researches carried out in different sites Cheile Turzii<sup>2</sup>, Limba (*Bordane, Șesu Orzii, Vărar*)<sup>3</sup>, Tărtăria-Gura Luncii<sup>4</sup>, Turdaș-La Luncă<sup>5</sup>, Zau de Câmpie-La Grădiniță<sup>6</sup> etc. triggered at different stages of the archaeological research more names for this cultural phenomenon: the group with painted pottery Lumea Nouă, the complex Lumea Nouă-Cheile Turzii, the complex Cluj-Cheile Turzii-Lumea-Nouă-Iclod<sup>7</sup>, the complex Cluj-Cheile Turzii-Lumea Nouă-Pișcolț-Iclod-Suplac<sup>8</sup> and, recently, as “Lumea Nouă (Zau) pottery type”<sup>9</sup> or Zau culture<sup>10</sup>.

The specific pottery inventory comprises vessels of small or medium dimension among which predominate the semi-spherical bowls (**pl. 1–2**)<sup>11</sup>, dishes and quadrilobate pans<sup>12</sup>.

Another feature is represented by the white or cream-coloured ground over which is painted,

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<sup>1</sup> Berciu, Berciu 1949, p. 4; Berciu 1968, p. 55–57; For the history of older or more recent researches and complexity of the site from Lumea Nouă see (Gligor 2009).

<sup>2</sup> Vlassa 1967, p. 416; Paul 1992, p. 120; Maxim 1999, p. 72–74.

<sup>3</sup> Berciu, Berciu 1949, p. 24–25; Paul, Ciută 1997, p. 2–3.

<sup>4</sup> Luca 2016, p. 24.

<sup>5</sup> Luca 2001, p. 70–71.

<sup>6</sup> Maxim 1999, p. 75; Lazarovici *et alii* 2002, p. 7.

<sup>7</sup> Maxim 1999, p. 69.

<sup>8</sup> Maxim 1999, p. 69; Suciu 2009, p. 175.

<sup>9</sup> Luca 2016, p. 159.

<sup>10</sup> Lazarovici 2012; Lazarovici *et alii* 2011, p. 77–82.

<sup>11</sup> Gligor 2007, p. 45, no. cat. 27–29; Gligor 2009, p. 66, Pl. CLXV, CLXVI, CLXXIII.

<sup>12</sup> Berciu, Berciu 1949, fig. 7; Maxim 1999, Pl. XII; Gligor 2007, p. 45; no. cat. 30; Gligor 2009, p. 66, Pl. CLXIV.

before firing with different tones of red different decorative motifs<sup>13</sup>, in the late phases of the culture completed with a black painting (“bitumen”<sup>14</sup>) applied after firing<sup>15</sup>.

The decoration consists of horizontal lines (**pl. 1/4**) or vertical (**pl. 2/6–7**), simple circles (**pl. 1/1**) or concentric, spirals, “pearled” motifs<sup>16</sup> (**pl. 2/6**), crosses, triangles (**pl. 1/2–3**), rhombi, broad lines etc<sup>17</sup>. Illustrative of the handicraft of potters and some specificities of the implements used are the bands made of 4<sup>18</sup> to 7<sup>19</sup> parallel lines disposed horizontally, under the rim (**pl. 1/5, 7; 2/1–3**), vertically (**pl. 1/3; 2/1–4; 6–7**) or in symmetrical registers as arcades (**pl. 1/6–7; 2/4–5**)<sup>20</sup>. What astounds is the narrow width and that these are exactly parallel, likely traced by a single stroke. The manner how the pictural layer was applied or processed, triggered the migration of the pigment only in the areas between the lines and very rarely outside the bands, the outcome being obtaining two shades of colour, different, interlaid which are evidenced against the white ground of the vessel.

Archaeometric analyses (XRD, XRF, OM) of the composition of some samples of white engobe, carried out on pottery from the Lumea Nouă site<sup>21</sup>, identified an important percentage of CaO<sup>22</sup> following the use of calcareous clays, or the addition of calcium carbonate in the engobe made of clay<sup>23</sup>. For the colour red, ferruginous clays were used that can get different shades of red, puce or black, dependent on the firing gases<sup>24</sup>.

Besides the complex analyses on the sources of raw materials<sup>25</sup> and pigment composition, Lumea Nouă pottery was the subject of some complex paleotechnologic experiments, scientifically structured, also carried out within „1 December 1918” University, within which the authors succeeded to reclaim the whole operational sequence starting from modelling, decoration to firing pottery<sup>26</sup>.

Within previous experimental approaches<sup>27</sup>, we encountered difficulties in making some engobes from calcium carbonate or identification in the field of some good sources<sup>28</sup>. Different sources of „white clays” were sampled from the Ampoi Valley (localities Feneș-Bulbuce, Presaca Ampoiului-Valea Bibartului and the Sebeș Valley-Râpa Albă). Most of the samples came from sedimentary deposits associated with sands, the texture being inappropriate to our purpose. The only available source was identified in the eastern slope of the Mamut Hill<sup>29</sup> (the elevation

<sup>13</sup> Maxim 1999, p. 74, Gligor 2007, p. 44–45; Gligor 2009, p. 64–65; Lazarovici 2012, p. 56–57, 62.

<sup>14</sup> Analyses made for the black pigment, “bituminous” like used at painting the pottery of Suplacu de Barcău group discovered at Porț-Corău (Sălaj county) identified a mix of tree resin obtained from birch bark and bitumen (Popescu 2014.)

<sup>15</sup> Gligor 2009, p. 66, 68–69, 161; Lazarovici *et alii* 2011, p. 78.

<sup>16</sup> Gligor 2009, p. 66.

<sup>17</sup> Maxim 1999, p. 75, pl. XI–XIV; Gligor 2007, p. 46–49, no cat. 27–30; Gligor 2009, p. 65–69, Pl. CLVII–CLXXVII; Lazarovici 2012, fig. 3a, 5, 10–11.

<sup>18</sup> Gligor 2007, no. cat 27; Gligor 2009, p. 65–67, Pl. CLXVII; CLXXIII.

<sup>19</sup> Gligor 2009, p. 68, Pl. CLXXIII/10.

<sup>20</sup> Lazarovici 2012, p. 65.

<sup>21</sup> Varvara *et alii* 2008, p. 11, fig. 4; Gligor 2009, p. 94.

<sup>22</sup> Varvara *et alii* 2008, p. 8, table I; Gligor 2009, p. 94.

<sup>23</sup> Gligor 2009, p. 94.

<sup>24</sup> Shepard 1985, p. 26; Gligor 2009, p. 65; Lazarovici *et alii* 2011, p. 78. Uneven firing may be noticed by differences of tones in the red pigment from the surface of the same vessel (Gligor 2009, Pl. CLXVII; CLXIX/11; CLXX/12; CLXXI/9).

<sup>25</sup> Bințișan *et alii* 2017.

<sup>26</sup> Gligor, Bințișan 2016.

<sup>27</sup> Anghel 2001a; Anghel 2001b.

<sup>28</sup> At the beginning of the ‘90s, without some archaeometric analyses, it was considered that kaolin clays represent the main material used to obtain white engobes (Ellis 1984, p. 119–121; Alaiba 2007, p. 42–45; Lazarovici, Maxim 1995, p. 222).

<sup>29</sup> Hill, 773 m altitude, located at west of the town of Alba Iulia, part of the Metaliferi Mountains (Muncii Vințului subzone).

of the bicycle lane) as fine-grained carbonate lenses (**pl. 3/1**), included in the quaternary sedimentation of detritus and clays.

Another stream of research involved obtaining the pigment by adding ground lime dust in the casting slip (**pl. 3/2, 4**), a toilsome operation, and the obtained granulation represented a challenge when it came to application and polishing.

For the colour red, a wide variety of red clays may be used, more sources being identified nearby Alba Iulia town: the Ampoi Valley-*La Pietre* (compacted clay boulders), the Bilag Hill (red clays that contain mica), Galda de Jos (yellow clays, that during firing become crimson) (**pl. 3/10**). Ferruginous nodules were identified at *Râpa Roşie* (Sebeş locality) (**pl. 3/9**)<sup>30</sup> and *Gruicul Fierului* (Ghirbom locality).

It is considered that pigments were ground and then mixed with organic substances, that acted as binders and dispersion mediums<sup>31</sup>, the working methods being varied and confirmed by analogies from diverse ethnographical environments<sup>32</sup>.

To identify some possible methods and used implements for painting were made more vessels by modelling in the roll technique that copies specific forms of the cultural group Lumea Nouă (**pl. 4/1–2**). The white ground was made by adding in the ground and dried clay a quantity of 25% of calcium carbonates sampled from the eastern slope of the Mamut Hill (**pl. 3/6**), or obtained by grinding some blocks of limestone (**pl. 3/5**). The application was made by brushing on in more layers or hand spreading, the latter operation being the most appropriate as it allows excellent finishing of surfaces (**pl. 4/3–4**). After partial drying, pieces were polished with a whetstone, fine-grained. For the red pigment was used yellow clay from Galda de Jos, ferruginous nodules from *Râpa Roşie* ground and mixed with clay.

For abstract painting may be used different types of implements such as feathers, rope ends, little sticks whose end was wrapped in wool or cloth or direct application with the finger (**pl. 4/5–8**). Following painting with implements that we made, the obtained results were satisfactory (**pl. 5/1a–1b**). In exchange, to obtain the parallel lines, even if high-quality, modern brushes were used complementarily, challenged us, and the outcomes were entirely different in comparison with the aspect of the original pieces (**pl. 5/2a–2b**).

While reassessing more pottery fragments decorated with bands of parallel lines preserved in the collections of the National Museum of Unification Alba Iulia and 1 December 1918 University of Alba Iulia was noticed that some pieces had fine incisions intermingled with the parallel lines (**pl. 2/1–4**). Initially, we considered these graduations as the outcome of the manufacture of some less skilful potters or technological vices. At the same time, a series of pieces were identified that represent the intention of tracing more lines, which due to different reasons, in the subsequent stages of the operational sequence, identified with some wide bands<sup>33</sup> (**pl. 2/6–8**). On a fragment of the collection of “1 December 1918” University of Alba Iulia, one may notice the parallel incisions with a slightly curved follow-up that may be attributed to an arcade even if the colour layers faded completely (**pl. 2/5**).

These technological markers indicate a new painting style as for colour brushing on Neolithic pottery and assumes removal by partial excision of the pigment layer. The fact that the lines are parallel suggests the use of a small comb by which tracing is made simultaneously for the whole band. To test the working technique were pressed more clay tablets covered with white engobe, made of the same type of clay and calcium carbonate. After a partial drying, the surface was polished, and on it were painted with a little stick with cloth at the end wide bands with red engobe made of clay and iron oxide (**pl. 5/3a**). On tracing attempts with a wooden comb or,

<sup>30</sup> Borza 1959, p. 16–17, 26, 28.

<sup>31</sup> Palaguta 2002, p. 628; Boghian *et alii* 2015, p. 446.

<sup>32</sup> Shepard 1985, p. 33–35; 71–72.

<sup>33</sup> Gligor 2009, Pl. CLXIX/3–5; CLXX/14.

repeatedly, with a bone spatula, was noticed the impossibility of rendering some effects similar to the archaeological pottery, the pigment coated too quickly to the surface of samples. It was considered appropriate obtaining a thicker solution with slower drying to allow selective removal of the pigment. Additions of organic substances as the flax oil and sunflower oil, animal suet, egg-white and yolk of different concentrations were tested, yet the expected results were not obtained. In exchange, the use of honey<sup>34</sup> of approximate 6–8% concentration offered excellent results allowing partial excision of colour and subsequent polishing of the painting (**pl. 5/3a–3f**).

To have the experiment confirmed was mandatory to model some vessels to practice this technique (**pl. 6/1–3**). Acquiring the necessary skill involved painting five pieces to obtain some satisfying results (**pl. 6/4**). Repeating the experiment was absolutely mandatory to acquire and perfect the working technique which by the new manner of approach was utterly unknown to us as manners of approach are concerned.

More interference points were noticed, related to drying of the white ground, dilution of the red pigment and, the most important, the position of the hand and vessel at the moment of tracing.

The parallel lines are obtained in a single stroke, the operation being carried out independently for each element of the decor, and the vessel must be held in one's lap. At the same time, with the left hand, the vessel is rotated the opposite way. After several minutes, the band is polished, the drying time being critical to obtain the expected results (**pl. 7/3, 5**). Polishing is also necessary for mechanical imparting of the pigment to paste, this being easily removed or dispersed on the surface following contact with the hand or work support during manufacture. If the pigment is too moist, the lines fuse (**pl. 7/1**), and a too dry engobe does not allow obtaining a lighter tone of the intermediary shade (**pl. 5/3**). When unevenly pressed with the comb, scratches of the white ground may appear, hence these sometimes may be concealed by polishing (**pl. 7/2, 5**). In the pottery inventory of the cultural group Lumea Nouă are also documented pieces to which spaces between the red lines are complemented by painting based on organic substances did after firing<sup>35</sup>. The selective „excision” technique of the pictural layer also produces slight level differences on the vessel surface. Sunken lines may be used, after vessel firing, as support for binding the black pigments and obtaining some three-colour effects, a technique similar to incrustation<sup>36</sup>.

The working method is not simple and necessitates a certain period to acquire the necessary skill. Decoration of this type of vessels is identified as a specific technique, feature of some skilful potters that knew very well the properties and behaviour of materials that they used. The fact that we find on the surface of archaeological evidence a series of technological vices indicates that within the operational sequence appeared a series of external factors difficult to control even for the experienced potters that made this type of vessels.

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<sup>34</sup> Usage of honey or beeswax as addition is also remembered by other experimenters (Bințișan 2014, p. 8; Dănilă 2014, p. 156).

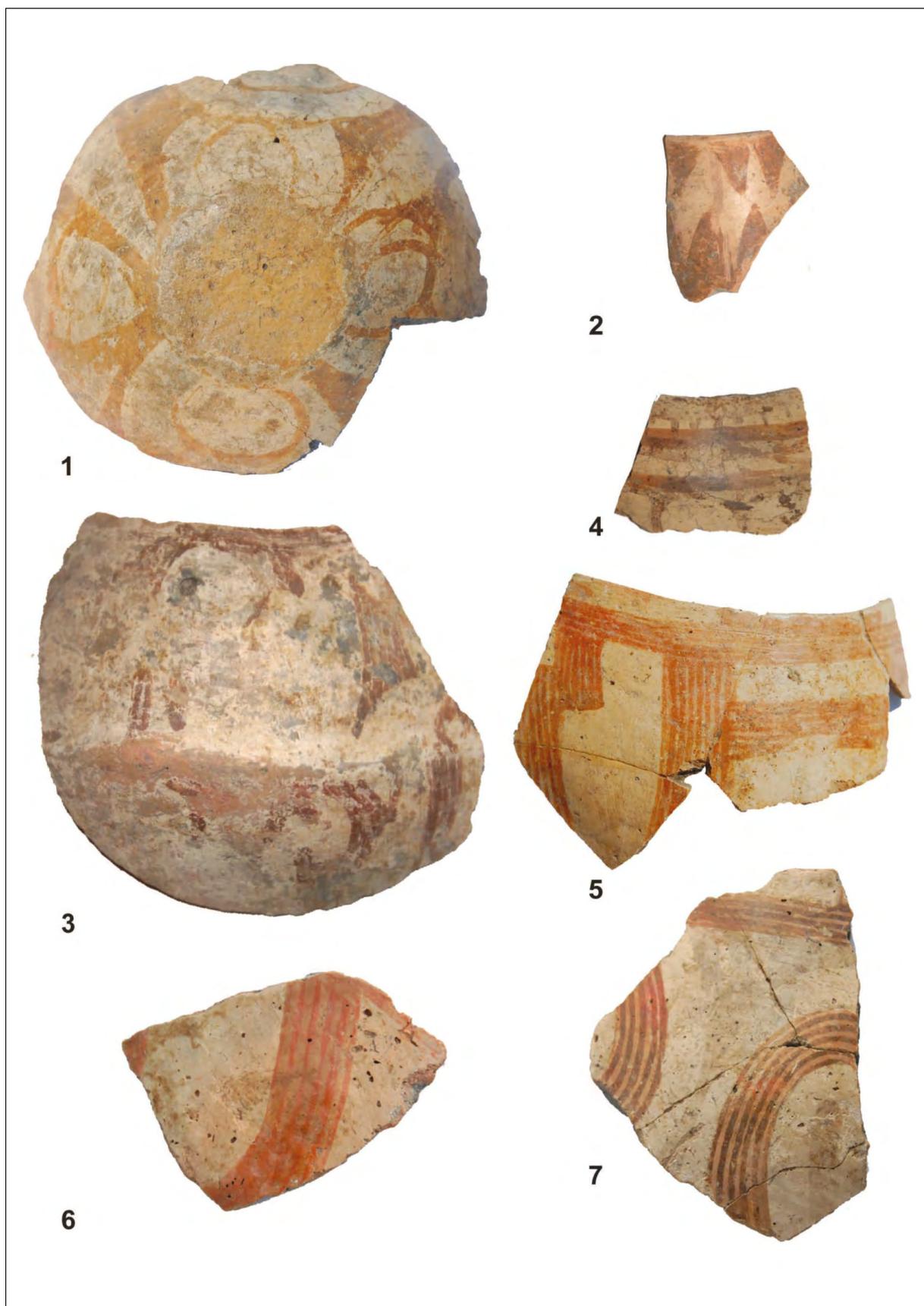
<sup>35</sup> Gligor 2009, p. 68.

<sup>36</sup> This technical-decorative feature is the subject of future experiments.

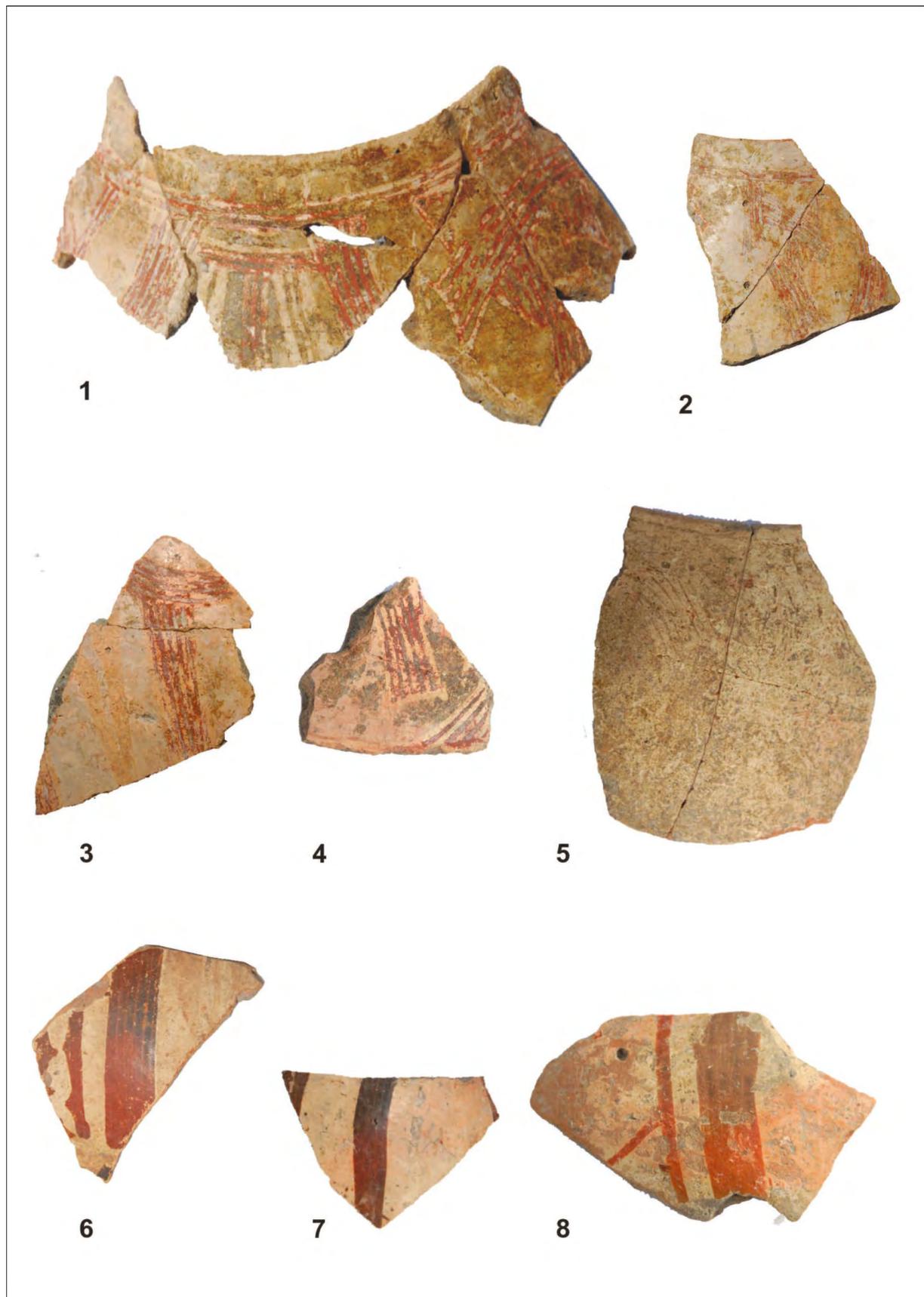
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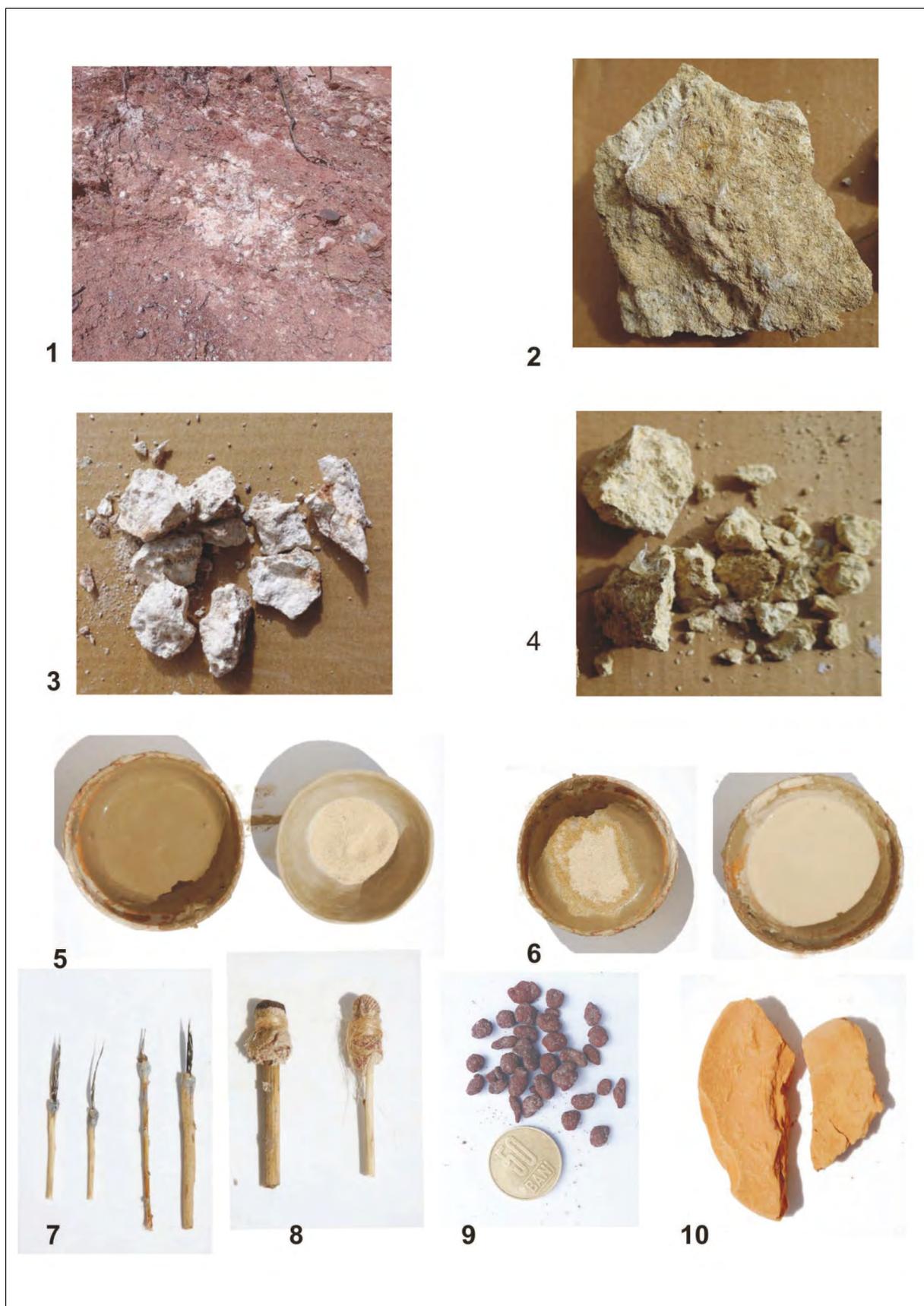
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**Pl. 1.** Lumea Nouă pottery: 1–5. collection of the National Museum of Unification Alba Iulia; 6–7. collection of the „1 December 1918” University of Alba Iulia.



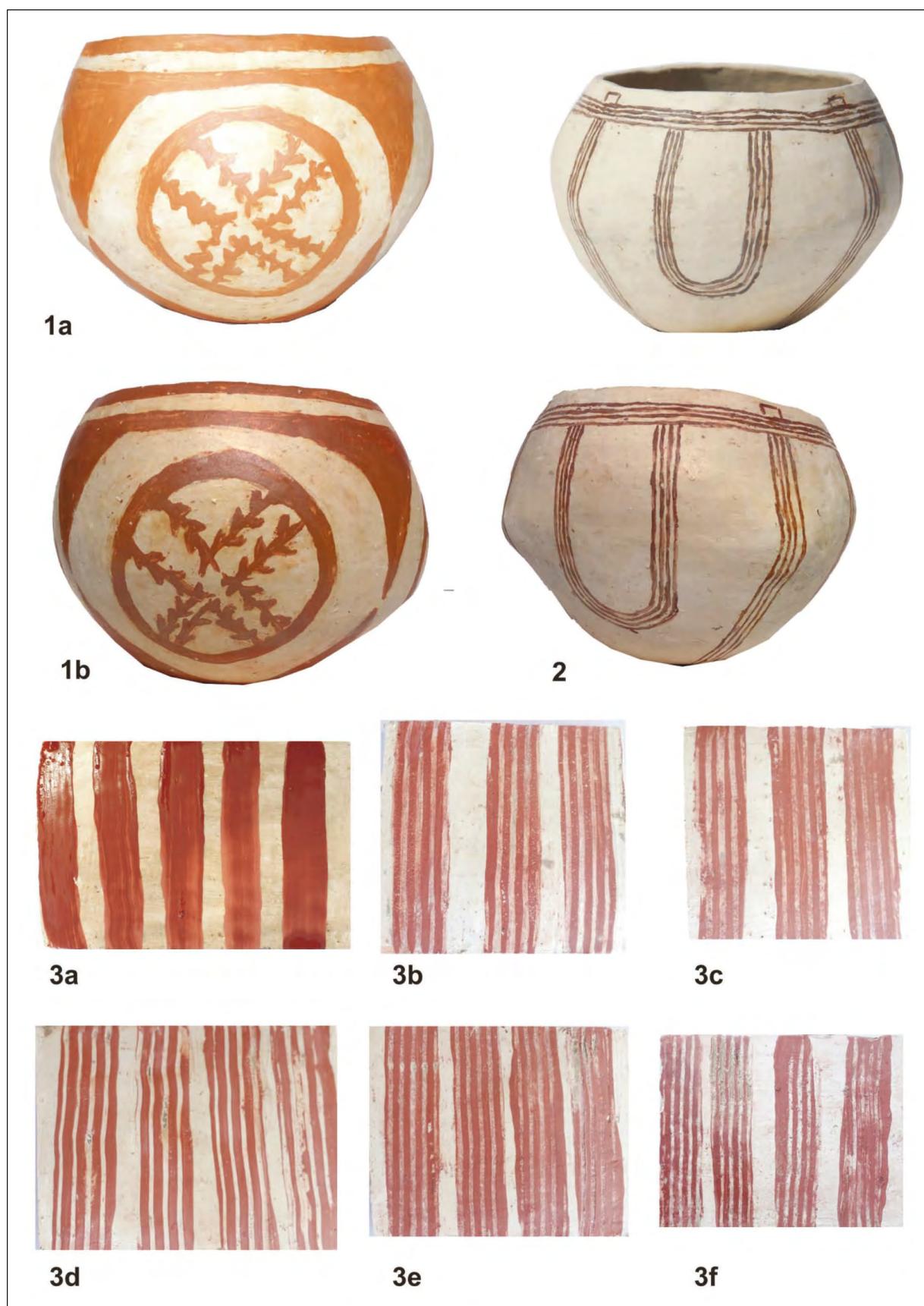
Pl. 2. Lumea Nouă pottery: 1–4, 6–7. collection of the National Museum of Unification Alba Iulia; 5, 8. collection of the „1 December 1918” University of Alba Iulia.



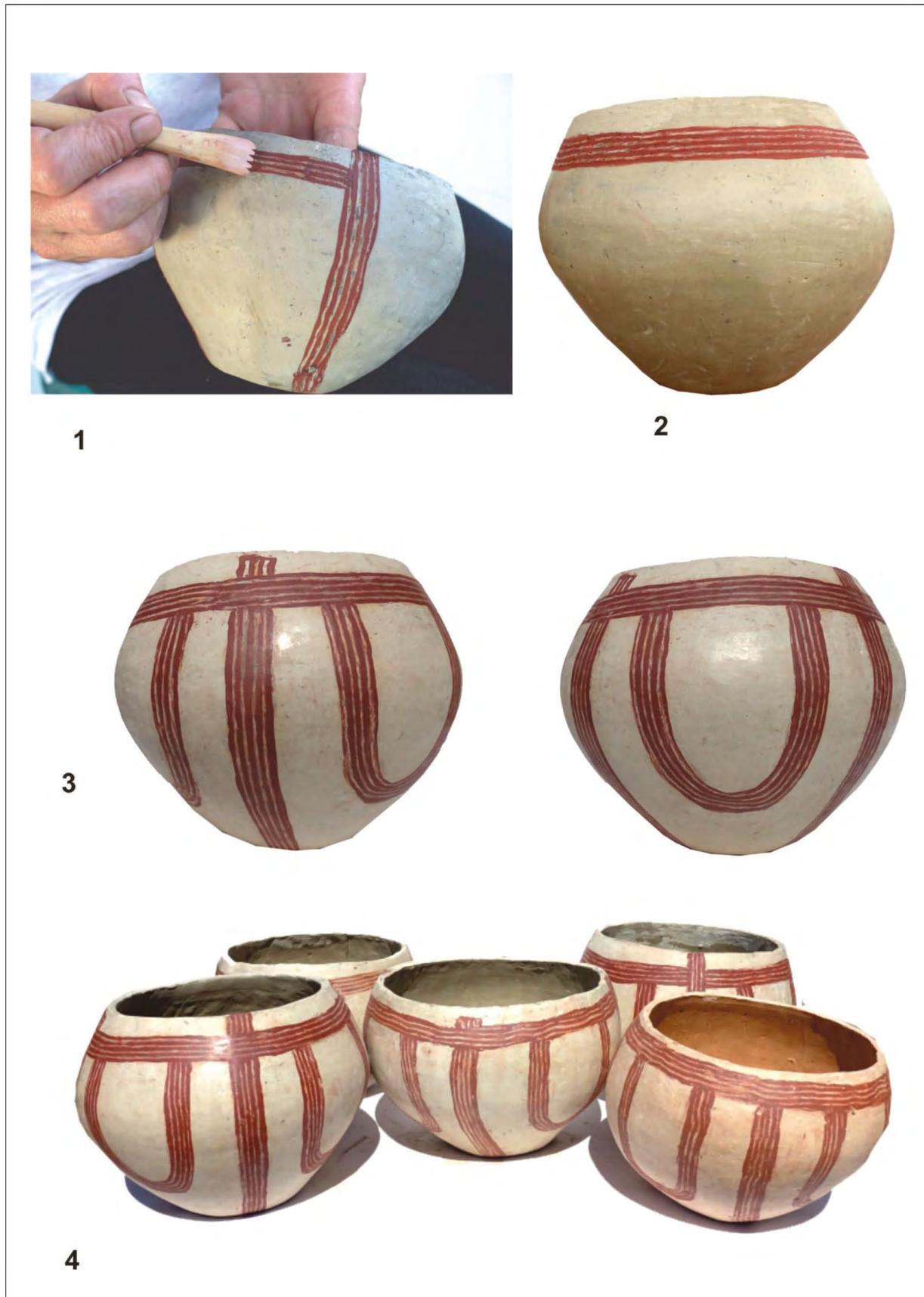
**Pl. 3.** 1, 3. Carbonate lenses (the Mamut Hill); 2, 4. ground limestone; 5–6. pigment mixing in engobe; 7–8. painting implements; 9. ferruginous nodules (Râpa Roșie), 10. yellow clay (Galda de Jos).



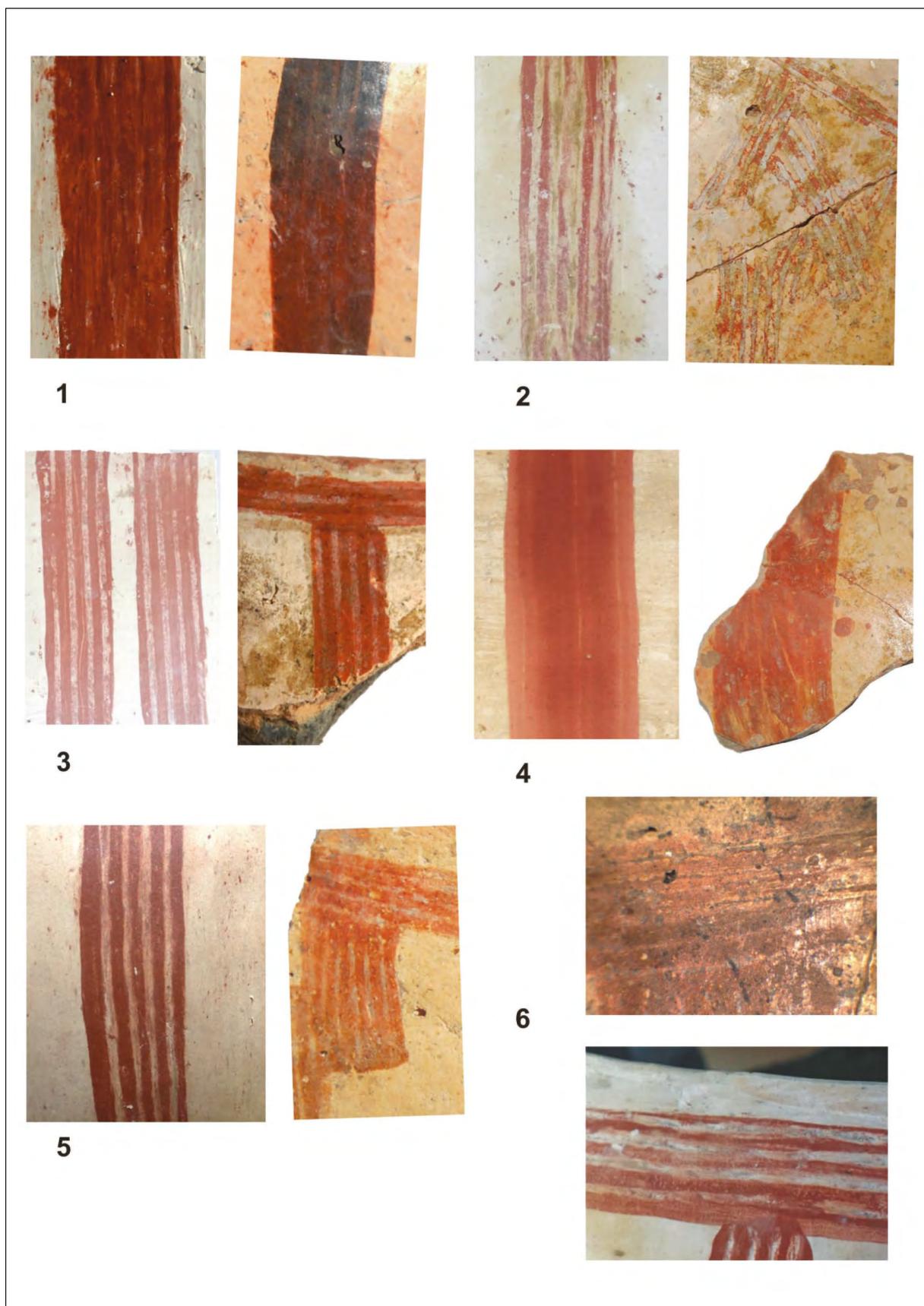
Pl. 4. Experimental propositions for methods of modelling and decorating the Lumea Nouă pottery.



Pl. 5. 1–2. Copies of Lumea Nouă pottery after painting and firing; 3. samples of tracing the bands made of parallel lines.



Pl. 6. Experiments of painting in the style of Lumea Nouă pottery.



Pl. 7. Similarities of the results of experiments with Lumea Nouă pottery.