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INSTITUTE FOR THE STUDY AND VALORIFICATION
OF THE TRANSYLVANIAN PATRIMONY IN EUROPEAN CONTEXT

ACTA TERRAE SEPTEMCASTRENSIS

VII

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Sibiu - 2008

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**“LUCIAN BLAGA” UNIVERSITY OF SIBIU
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ACTA TERRAE

SEPTEMCASTRENSIS

VII

Proceedings of the International Colloquium:

The Carpathian Basin and its Role in the Neolithisation of the Balkan Peninsula

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Sibiu, 2008

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EXPERIMENTAL ARCHAEOLOGY
THE CONSTRUCTION OF A FIRE INSTALLATION (HEARTH) ON THE
MODEL OF THOSE DISCOVERED AT PĂULENI CIUC – CIOMORTAN
“DÂMBUL CETĂȚII”, HARGHITA COUNTY

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Key words: *Neolithic, experimental archaeology, Transylvania, Romania.*

Abstract: *The experiments took place simultaneously with the archaeological researches from Păuleni Ciuc – Ciomortan, in August and September 2006.*

Our experiments consisted in the construction of a fire installation (hearth with a stone made pavement) and its utilization inside the archaeological camp, both for heating and food preparing.

The experiments took place simultaneously with the archaeological researches from Păuleni Ciuc – Ciomortan, in August and September 2006.

The prehistorical settlement from Păuleni Ciuc is known under the name of Ciomortan or *Șoimeni*. The settlement is situated at about 8 km north-east from Miercurea-Ciuc city and at about 1 km north-east from *Șoimeni* village, in the place called by the villagers *Várdomb (Dâmbul Cetății)*.

The settlement has oval shape, with a surface of about 60 (north-south) x 90 (east-west) m. The site's emplacement in this point was well chosen by the prehistorical communities. The settlement is well hidden between the hills of the west slope of the Ciucului Mountain and it offers a good visibility over the Ciuc Valley.

The settlement was discovered in the interwar period by Al. Ferenczi who included it in the repertory of dacian fortresses from Transylvania. Between 1956, 1960 and 1967 archaeological researches were made here by Székely Zoltán (Székely, 1970, 71; Zaharia, 1995, 151-152).

The settlement was inhabited in the Early Copper Age (*Cucuteni-Ariușd* and *Bodrogkeresztur* Cultures), in the Late Copper Age (*Coțofeni Culture*) and in the Middle Bronze Age (*Costișa - Ciomortan* and *Wietenberg Cultures*).

Between 1999 and 2006 the director of The Museum of Eastern Carpathians from Saint George, Mister Valeriu Cavruc, coordinated the archaeological researches (Cavruc, 2000, 99; Cavruc, 2000a, 173-176; Cavruc, 2001, 55-75; Cavruc, 2002, 89-95; Cavruc, 2003, 129; Cavruc, 2005, 81-123; Janovits, 1999, 121-150; Comşa, 2000, 173-176; Cavruc, Dumitroaia, 2000, 131-154; Cavruc, Rotea, 2000, 155-172; Cavruc, Buzea, 2002, 41-88).

Types of stone made pavement discovered at Păuleni Ciuc-Ciomortan.

The Cucuteni-Ariuşd eneolithic inhabancy

House No. 4. Before building the hearth the eneolithic layer was deepened (old humus), and then a bed of flat stones was arranged (pavement). The hearth had a circular form with the diameter of about 2-2, 2 m (Pl. I/3, 4). Around the hearth there have not been discovered remains of a pit, so that we can consider that the hearth was covered with a construction. Probably the hearth was situated under the free sky, in the same way as hearths of big dimensions are situated sometimes. In that situation we can't talk about a simple domestic hearth, but, very probable, about a watch hearth belonging to some hunters' troops or to those who had to guard domestic animals (Lazarovici et al, 2000, 103).

House No. 16. The hearth was arranged on a stone made pavement and it had a circular shape, with a diameter of more than 1,6 m. The hearth was constructed, as well as in House No. 4's case, by deepening into the eneolithic layer, represented here by the ruins from House No. 5.

A small part from the hearth's superior side representing the fine daub was kept. The pavement instead was dense, it had a bulkiness of more than 0, 2-0, 3 m and it was compound from flat stones, probably detached from the local rock (Pl. I/2). After they were destroyed, the stones which were part of the pavement were spread. (Lazarovici, Buzea, 2005, 27).

In the space between House No. 21 and House No. 24, there were discovered the remains from two hearths. The first was partially placed over the house's floor. Probably it had a rectangular shape with the dimensions of 1.4 x 1 m and it was formed of an agglomeration of great stones (Pl. I/5). The second hearth was formed of an agglomeration of flat stones. Probably it had a rectangular shape, with its kept dimension of 1 x 0.7 m (Pl. I/6). The pavement's kept bulkiness was of about 0.1 m. The hearth's fine daub was destroyed in the past.

Middle Bronze Age. Wietenberg inhabancy

House No. 8. On the stepping level, approximately in the house's centre, there have been discovered two fire hearths, with circular shapes and daubed surface (Pl. I/7). The first one was arranged on a pavement of stones and ceramic fragments (Pl. I/8), and it had the diameter of 0, 6 m (Cavruc, Buzea, 2002, 46, pl. VII).

House No 10. Two fire hearths were discovered, placed relatively in the centre of the house. They were arranged with daub of fine clay, on a stone and ceramic fragments structure. The first one was kept fragmentary, from the daub dust remains; the circular shape was reconstituted, with a diameter of 0, 6 m. The second

hearth was situated south of the other one and it had a circular shape with a diameter of 1, 1 m (Cavruc, Buzea, 2002, 48, pl. XV).

Experimental Archaeology

In Romania experimental archaeology was very little used, even if it can offer explanations and it can suggest interpretations on frequent riddles encountered during archaeological researches. Years ago, during some archaeological researches, some experiments were made but they only followed aspects as ceramic moulding and burning. A stone hatchet was made, for the first time, at Poduri, and a house was also built, following the model of the houses known in the area of Cucuteni cultural complexes (Monah et al, 2003, 65).

At Cucuteni, inside the Experimental Archaeological Park, tools and houses were realized through experimental archaeology (Petrescu-Dîmbovița, Văleanu, 2004, 337, fig. 310-319). In 2004 there were 120 years since the experimental archaeology was discovered. The majority of specialists from our country and from abroad, preoccupied of this culture, met at Piatra-Neamț, during The International Symposium „*Cucuteni 120 de ani de cercetare – Timpul Bilanțului*”. They were invited to Cucuteni, where there have been made a series of experiments which tried to cover almost all the aspects of eneolithic material life (food and salt producing, products preservation, etc). With that occasion two houses that were built after the model of the cucutenian ones were deliberately set on fire.

An ample study named „*The reconstitution of prehistorically technologies and installations for ceramics burning*” was realized by Felix-Adrian Tencariu, from “A.I.I. Cuza” University, Iași. The experiments took place at Cucuteni and Isaia, simultaneously with the archaeological researches from 2003 and 2004 campaigns. The author’s research report has two distinct parts, determined by the two fundamental objectives of the project. First of all, archaeological and ethnographical literature was researched, with the purpose of centralizing prehistorical and traditional techniques and technologies of ceramics burning, and, secondly, the main objective, was their experimentally reconstitution (Tencariu, 2005, 2).

Our experiments

Our experiments consisted in the construction of a fire installation (hearth with a stone made pavement) and its utilization inside the archaeological camp, both for heating and food preparing.

Used materials

Clay

The clay was identified near the settlement, on the shore of Nyirpataka brook (Pl. I/1). The clay was yellow and it contained a lot of impurities (little stones, mud, etc). It was transported inside the camp by using plastic recipients. The clay was stored for a few days in a big plastic recipient full with water and kept *to rise* (Pl. III/1, 2). From time to time, it was kneaded with hands, feet and modern tools (spade or shovel). For this experiment we considered as necessary to take the clay from a place nearby the settlement. Other sources of clay were not searched for in the area (this thing will be accomplished in a future experiment).

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The necessary water for the experiment was taken from the Nyirpataka brook, which, with no doubt, represented the main source of water in prehistory too. In our days the inhabitants from Păuleni-Ciuc commune use the water from this brook because it has a very good quality.

The clay used for the hearth's smoothing was mixed with sand from the river (also brought from a place nearby) and with ashes (from the old hearth placed in the archaeological camp).

Before mixing the clay, in order to construct the hearth, a small quantity of clay was gathered separately, (about 1 kg) with the purpose of making pottery. To do that, sand and pounded pottery was used as degreasing substances.

The stones (the hearth's pavement)

The hearth's pavement belonging to Cucuteni-Ariuşd settlements, discovered and researched in 2006 (25, 26 and 27 Complexes) was disassembled; some of the stones from the pavement were brought in the camp to be used in our experiment. These stones have different dimensions and shapes, some of them are flat (detached probably from the local rock) and others are almost round (probably river boulder).

The wood

Nearby the settlement there is coniferous forest (fir tree, spruce fir, pine). Although we are at an altitude of over 800 m yet, the fir forest is preponderant. Only at an altitude of over 900 m appears the leaf bearing forest, especially beech forest. These changes of the forest disposal appear because that area is a valley.

In our experiments for making and maintaining the fire, we used both dry and green wood.

The heart's construction

The place where the new hearth was located is situated near by the archaeological camp. Because the ground was in a light slope, it needed to be levelled (the levelling was made by using modern tools, spade and shovel) (Pl. II/1, 2).

After obtaining a flat surface on the ground the stones from the heart's pavement were arranged. The stones were arranged in a circular shape with the diameter of about 1m (the pavement's bulkiness did not pass over 0,2m). The remaining space between the stones was filled with earth (Pl. II/3-7). The earth from the hearth's pavement was watered and left at the sun to dry for a day (Pl. II/8).

The next day the clay was placed uniformly over the stone made pavement so that all of the stones to be covered. As a matter of fact a part of the daub reached at the edge of the hearth, over the ground (Pl. III/3, 4). In a first stage the levelling of the hearth's surface was made only by hand (Pl. III/5). We noticed the fact that the heart's daub didn't have the look that we wished for (it wasn't fine). We decided to prepare an amount of clay without impurities and we mixed it with fine sand. The clay was placed on the hearth's superior part and it was well smoothened with a piece of dry wood (a spatula made from a fir tree) (Pl. III/6). After smoothing, the hearth was left to dry at the sun for a day.

On the third day, we arranged on the hearth a pile of light fuel (compound from dry and small fir and spruce fir branches) and we burnt it (Pl. III/7, 8). Because the

fire didn't cover the whole surface of the hearth, the embers were moved with the help of some sticks made from a green piece of wood. This preceding of moving the fire all over the hearth's surface was repeated all day long.

On the fourth day, we placed on the hearth a great quantity of fuel compound from fir and fir tree wood, cracked from tree trunks (Pl. IV/1). The wood was burnt until the hearth's surface became hard (Pl. IV/2). We noticed the fact that the hearth's daub cleaved here and there, and that it took the shape of a „*honey comb*” or of a „*mosaic*” like the hearths discovered *in situ* after the archaeological researches.

In practice, after the arrangement of this stone made pavement hearth, the other hearth used until then in the camp (without pavement) was abandoned.

The hearth's utilization. Auxiliary experiments

Pottery

After removing the clay's impurities, the clay was well kneaded and mixed with fine sand and pieces of very fine-pounded pottery. Only five of those left in the archaeological camp started to make pottery and ceramic objects. We must mention the fact that four of those interested in manual pottery making, practiced this „*handicraft*” for the first time in their life.

Each of us tried to make forms as simple as possible (glasses with the shape of a truncated cone or cups) but also others, more complicated (an amulet and an anthropomorphous idol). Each one of these pieces was made by hand, moulding only one portion of clay (Pl. IV/3, 4).

Using wetted hands we made the bulkiness uniformity of the vessel's walls. Each ceramic object was then well smoothed and kept out to dry for some hours. After the pieces were dry we passed on to their smoothing. Some of the pieces were decorated with incisions, realized by using sharp tools made from wood or bone (Pl. IV/5). The ornamental motifs were formed of simple lines, incised strips, stitching and excised lines.

Because we were reaching at the end of our archaeological campaign, after the stage of ornamenting the pottery, all the objects were left out to dry (Pl. IV/6). The object's drying was a fast one because they were kept out without being protected from sun, wind or strong humidity.

The polishing of the vessel (for both aesthetical and practical purpose) was realized when the objects were dry. The vessel's walls were lightly wetted from time to time and then, with the help of some fine stones and „polishers” made by us from fir tree branches, every object was polished. The polishing activity took place at night, around the fire hearth, during more hours of work (Pl. VI/2). The polishing quality resulted from our skills, some pieces took a „*metallic aspect*” and others remained only well smoothed (Pl. VI/3).

In order to use the hearth we have built, as a last stage, we decided to burn in free air all the objects we manufactured. For this purpose, on the constructed hearth, we placed a great quantity of fuel compound of coniferous wood (fir tree and spruce fir), which was burnt for obtaining a great quantity of embers (Pl. VI/1).

After 2-3 hours in which the fire was supplied with wood we obtained a quantity considered by us to be sufficient to begin the burning the objects (Pl. VI/4). On one side of the hearth the ember was put away with a stick and a glass (with spherical base and straight lips) was placed on the hearth with its face down, in order to observe the quality of the burning. The other vessel and pieces were thrown directly into the ember. The vessel didn't break because it had small dimensions.

After approximately 1 hour, the vessel became incandescent. In the evening, the team supplied the hearth permanently with wood. The vessel was left in the ember till the next morning (Pl. VI/5).

All the wood burned, forming a dense stratum of ember and ashes over the ceramic objects. We tried to take off the ceramic objects with our hands, but it was impossible because they were still incandescent. Yet, with some sticks, the pieces were taken out from the fire and they were left to cool near the hearth (Pl. VI/6). Only one piece broke during the burning, an antropomorphous idol moulded from a single piece of clay, with its feet pasted together, and its arms disposed in cross, with a thin neck and with a circular shaped flat head). The piece broke around its neck and its head was hard to find between the remains of ember and ashes.

Archaeologically it was observed that the majority of antropomorphous idols discovered in the settlements of the Cucuteni-Ariuşd-Tripolie Culture have their head broken from the past (Monah, 1997). The burning of idols is usually an oxidating one, but we do not exclude the possibility that in the past the burning could have been made in free air, even on hearths. The pottery had a good enough burning and its colours were light brown (some of them were even brown-yellowish), only the glass with spherical base, which was placed with its face on the hearth, had its interior brown towards black.

When we filled the glasses with water we observed that their walls soaked immediately. Even if, functionally, the ceramics we made couldn't be used (especially for liquids consumption), in a decorative aspect it represented a success, taking into account that this experiment was made by our team for the first time, without having any knowledge about the art of pottery.

The clay's composition varies from a geographical area to the other, the existence inside it of other substances, except of those which are elementary (aluminium dioxide, silicium dioxide and molecular water), offers different characteristics about the composition's plasticity, colour and burning temperature (Anghel, 1998, 133; Anghel, 2000, 171).

This type of burning was experienced in other archaeological experiments. Free air burning, above all assumed (because one cannot state precisely if fire hearths, very frequent, had this purpose too) has the impediment that it is directly influenced by the atmospherically conditions, thus resulting a direct burning, as well between the vessels from one stage as on a singular piece, depending on its position in the fire. We placed some vessel on a hearth; we covered them with wood and burnt them for approximately three hours, supplying permanently the fire. After approximately one hour, the vessels became incandescent, but already a part of them were cracked or broken. After the burning process was complete, we saw that

only a quarter from the total amount of vessels remained untouched (intact), the other being rejects, either on the account of some manufacture errors, either because of the sudden increase or the great fluctuations of the temperature. Those which were whole showed a good enough burning; they had different colours, black, grey, brown, or even red spots (Tencariu, 2005, 20)

By all means in Cucuteni Culture the apogee of knowledge's about the ceramics technology and its burning techniques were reached. We state that, thinking about the fact that during the evolution of the technology in our history till the electrical oven was invented, except for the materials used in construction, the type of oven used for the ceramics burning, with two rooms disposed vertically, with a grate, remained the same and it is being used in our days by traditional potters (Tencariu, 2005, 15).

Food preparing

Vegetables and fruits were baked directly on the hearth by simply moving the ember from one part of the hearth to the other by using a stick.

In order to bake bread, we acquired from the village a quantity of about 2 kg of wheat. First it had to be grinded (Pl. IV/7, 8). The wheat grinding was realized with the help of some original tools (grinders and twinkles), which were discovered in the complexes belonging to the Cucuteni-Ariuşd-Tripolie eneolithic inhabitanacy.

With those stone made grinders and twinkles (Pl. V/1), two ladies, after working for almost four hours, succeeded to grind a quantity of about 1/2 kg of flour mixed with husk. That activity proved to be tormenting, being followed, in both ladies cases, by muscular fever and by peeling off of their hands.

The flour mixed with husk was also mixed with salt and water (Pl. V/2), obtaining some flat „bread”, with a circular shape (Pl. V/3, 4).

This “bread” was put after that on the well-heated hearth and kept there to bake for about a half of an hour (Pl. V/5). From time to time they were turned over with a wood made spatula (Pl. V/6). Once baked, the „bread” was eaten by the research team members, and it was considered to be very tasteful (Pl. V/7, 8).

Preliminary observations (remarks)

The fire installation (the hearth). Based on this experiment we noticed the fact that hearths constructed this way keep the heat around them much better.

The ember is very well kept until the next day, when one can make the fire only by putting some dry wood over the coals from the ashes remained on the hearth. Fruits, vegetables and “bread” (flour mixed with water and salt) were cooked on the hearth, by simply moving the ember from one side to the other with the purpose of being consumed inside the camp. In the rainy season, near the hearth, day and night, took shelter and slept the camp's dog, because there it was warmer.

The fact that the cucutenians preferred this type of hearths with pavement is do to the fact that summer nights (but especially the winter one's) in the Ciuc Valley are cool, and in order to keep the heat for a longer period of time this kind of constructions were needed.

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Even we, with all our modern equipment, preferred this type of hearth, both for heating and cooking.

At the end of the archaeological campaign, in September 2006, the ashes which remained around the hearth were spread and the hearth was covered with sod for the purpose of following its “behaviour” in the future (Pl. VI/7, 8).

We intend to use this hearth in our future archaeological campaign.

Food preparing

We intend, in our future archaeological campaign, to grind a much bigger quantity of wheat, in order to obtain bread or flat loaf. The wheat grinding will be realized by using a grinder of great dimensions (60 x 40 x 20 cm), which was discovered in an eneolithic house. The grinder’s surface is concave, do to its frequent utilization in the past. We will also use hand twinkles of great dimensions to make headway grinding. We will only use pure flour, separated from the husk.

We appreciate our attempt to produce “*bread*” only with the help of tools and methods used in the past as being useful. The fact that in every eneolithic house researched at Păuleni Ciuc – Ciomortan, were discovered numerous grinders and twinkles (some of them whole and others kept fragmentary), we can state that this activity was a very important one inside the cucutenian settlements.

Abbreviations

Aluta	– Revista Muzeului Național Secuiesc, Sfântu Gheorghe.
Angustia	– Revista Muzeului Carpaților Răsăriteni, Sfântu Gheorghe.
Marmația	– Revista Muzeului Județean Maramureș, Baia Mare
BCSS	– Buletinul Cercurilor Științifice Studentești, Alba Iulia
RPSS	– Revista de Politica Științei și Sociometrie

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Plate I. Păuleni Ciuc – Ciomortan „Dâmbul Cetății”, Harghita County

1, Archaeological settlement „Dâmbul Cetății”; 2-6, Cucuteni – Ariușd Culture; 7-8, Middle Bronze Age (Wietenberg Culture). 1. General view upon the site (view from the east); 2. House no. 16 – Hearth with stone made pavement; 3, 4. House no. 4 – stones from the hearth's pavement; 5. House no. 24 – fire installation close to the house; 6. Traces of the hearth with stone made pavement; 7. House no. 8 with two fire hearths; 8. House no. 8 – stone made pavement of the hearth no. 1).



Plate II. Păuleni Ciuc – Ciomortan „Dâmbul Cetății”, Harghita County

1. The hearth's location in the archaeological camp; 2. The ground levelling; 3-8. Arranging the hearth's stone made pavement.



Plate III. Păuleni Ciuc – Ciomortan „Dâmbul Cetății”, Harghita County

1, 2. The preparation of the clay; 3-5. Covering the stone made pavement with a clay stratum; 6. Smoothing the hearth; 7, 8. Wood burning on the hearth.





Plate V. Păuleni Ciuc – Ciomortan „Dâmbul Cetății”, Harghita County.

1. The manual grinding of the wheat and flour obtaining; 2. Dough preparation (flour mixed with salt); 3, 4. The obtained bread; 5, 6. Bread baking on the hearth; 7. Baked bread; 8. Bread tasting.



Plate VI. Păuleni Ciuc – Ciomortan „Dâmbul Cetății”, Harghita County

1-3. The activity of pottery polishing took place around the hearth; 4. The hearth's preparation for the pottery burning; 5. Burnt pottery on the hearth; 6. Pottery obtained as a result of the experiment; 7. Fire hearth after the ash was removed; 8. The hearth preservation after our team departed from the archaeological camp.