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POTTERY TYPOLOGY VERSUS TECHNOLOGICAL CHOICES: AN EARLY NEOLITHIC CASE STUDY FROM BANAT (ROMANIA)

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Preface

During 2003-2006 a project on the Starčevo-Criş pottery was carried out at the Institute of Archaeology, University College London (UK). The aim of the project was to shed more light on the Neolithisation process of the Balkan Peninsula. The methods employed to answer this question were scientific analysis of ceramics and fired clay objects, and radiocarbon dating of samples, from 20 early Neolithic sites in Serbia, Romania, and Slavonia.

The ceramic analyses were carried out in order to define possible routes of trade/exchange in the early Neolithic and the manufacturing process of fired clay objects. The radiocarbon dating was required to define an absolute chronology for the early Neolithic in this region and to identify possible routes for the spread of the Neolithic (*Biagi P., Spataro M., 2005; Biagi et al., 2005*).

Sites and their absolute and relative chronology

In this paper I will consider the correlations, if any, between the fabric and the typology of the ceramics analysed from the following sites in the Banat region of Romania: Dudeştii Vechi, Foeni-Sălaş, Foeni Gaz, Fratelia, and Parța.

The site of Foeni-Sălaş (*Greenfield H., Draşovean F., 1994; Ciobotaru D. L., 1998*) is located about 45 km southwest of Timişoara, 3 km north of the village of Foeni. Foeni Gaz (*El Susi G., 2002*, 15), is 2 km from Foeni-Sălaş, between the Bega and the Timiş Rivers. Parța (*Lazarovici Gh., et al 2001*) is located a few km south-west of Timişoara, whereas Fratelia (*Draşovean F.,*

2001) is within its southern periphery. Finally, the site of Dudeştii Vechi is located further north, close to the Hungarian border at 46°03'49" N and 20°28'38" E. The geology of the sites examined is fairly similar. According to the geological map of Timişoara, the area surrounding the site is dominated by Holocene alluvial deposits, primarily sands, clays and gravels (L-34-XXII, scale 1:200.000, Institutului Geologic Cartografi, *Petrescu I., Grigorescu C., 1966*). The site of Dudeştii Vechi is located on Holocene alluvial deposits, primarily sands and gravels. A few clay and *loess* deposits can be observed some 15 km E of the site (L-34-XV, scale 1:200.000, Institutului Geologic Cartografi, *Petrescu I., Grigorescu., 1962*).

Table 1: Early Neolithic sites of Banat: list of the fired-clay objects analysed from each site and attribution of sites to the relevant Starčevo-Criş typological phases

Site	Starčevo-Criş Phase	Ceramic samples	Cult objects	Spindle-whorls	Daub fragments	Net weights
Dudeştii Vechi	IIB, IIIA-B	20	1		3	2
Foeni Gaz	IIB	26	1	1		
Foeni-Sălaş	IIA	19	1	1	1	
Fratelia	IIA	42	1			
Parţa	IIIA	24	2			3

On the basis of the typological features of the ceramic assemblage (*Lazarovici Gh., 1979*), three sites were attributed to the second phase of the Starčevo-Criş (SC) culture, and the others to the third phase of the same culture (although two phases of the site of Dudeştii Vechi were analysed, see Table 1). Ten radiocarbon samples from four of the five sites discussed here were processed during the project. The results are shown below in Table 2 and Figure 1. The sites were inhabited in the first half of the sixth millennium cal BC. The two phases at Dudeştii Vechi seem to cover a rather short period with no indication of a gap between them.

Table 2: radiocarbon results from the sites discussed in the text. Calibrated date ranges shown are 95% confidence intervals, obtained using OxCal v3.5 and the IntCal98 dataset.

Site	SC Phase	Material	Lab number	Date BP	Calibrated date
Dudeştii Vechi	II	*Cervus elaphus*, humerus dx	GrN-28111	6990±50	5990-5720 cal BC
Dudeştii Vechi	II	*Bos sp.*, astragalus	GrN-28113	6930±50	5970-5710 cal BC
Dudeştii Vechi	II	Acorn (*Quercus* sp.)	GrA-26951	6845±40	5810-5640 cal BC
Dudeştii Vechi	III	*Quercus* and *Ulmus* charcoal	GrN-28876	6815±70	5840-5560 cal BC
Dudeştii Vechi	III	Bone perforator	GrA-24115	6920±80	5990-5640 cal BC
Foeni Gaz	II	Long bone flake	GrA-25621	6925±45	5890-5710 cal BC
Foeni-Sălaş	II	*Bos* sp., radius	GrN-28454	7080±50	6060-5810 cal BC
Parţa	III	Long bone flake	GrN-28877	6800±50	5780-5620 cal BC
Parţa	III	*Cervus elaphus*, metatarsal	GrN-28460	6860±60	5850-5630 cal BC
Parţa	III	*Bos* sp., ulna	GrN-28459	6660±60	5710-5470 cal BC

Methods

Pottery and fired clay objects (figurines, altars, daub, net weights, and spindle whorls) were analysed with three techniques: by thin sectioning, Scanning Electron Microscopy in combination with Energy Dispersive Spectrometry (SEM-EDS), and by X-Ray Diffraction (XRD). About 20-40 potsherds were analysed from each site. Samples were selected on the basis of their typological and stylistic variations, in order to provide a representative sample for most typological categories, or to cover most of the typology and different surface treatments represented in the excavated material from each site.

The following ceramics and fired clay objects were analysed:

- from the site of Dudeştii Vechi, 11 potsherds from the SC phase IIB and 9 sherds from the SC IIIA-B phase were analysed. Two net weights, an altar foot and three daub samples were also studied.
- from the site of Foeni-Sălaş, 19 potsherds, and a cult object, a spindle whorl and a daub sample.

- from Foeni Gaz, 26 potsherds, an altar foot, and a spindle whorl were analysed, and five different fabrics identified.
- from Fratelia, 42 potsherds and a "black magic tool" (*F. Draşovean, pers. comm. 2003*; sample FRT 35) were analysed.
- from Parța, 24 potsherds, three net weights, an altar foot, and a "black magic tool" (*F. Draşovean, pers. comm. 2003*; sample PRT15) were studied.

In this paper I will only consider the pottery and the cult objects.

Discussion

Raw material sources and temper

The clay sources exploited for pottery production at these SC sites are quite varied, although most of the objects analysed were made from raw materials that are non-micritic and micaceous (Fig. 2), and except at Dudeştii Vechi and Parța, humic (Table 3). Raw materials that were utilised less frequently included more micaceous clays, or clays rich in iron oxides and clay pellets, or containing fragments of polycrystalline limestone and naturally-occurring shells. Despite the overwhelming preference for non-micritic clays, in one case a slightly micritic source was used (at Parța) (Tables 3 and 4).

Three main types of temper were used in pottery production at Starčevo-Criş sites in Banat (Table 4). The most common is organic matter, typically wheat and barley chaff. Less frequently felspatic sand, composed of quartz, feldspar, and muscovite) was used, and occasionally pots were tempered with both sand and organics. In some cases, the choice of temper seems not to be strictly related to the choice of raw material (e.g. pots at Dudeştii Vechi), and in some cases it appears that the clay was not tempered at all, evidently because the clay was regarded as perfectly suitable for pottery production.

Globular vessels

This was easily the most common vessel form sampled, with 54 sherds analysed, representing all sites except Dudeştii Vechi, where this form does not occur (as the site is later than the other four). Globular vessels were manufactured from all the major raw material types identified

in Banat, other than the non-micritic clay with abundant thick lamellae of micas, which occurs only at Dudeştii Vechi. These vessels were tempered with organic materials, or organics and sand. In only one case there was no artificial addition of inclusions[1].

Short-necked globular vessels (6 samples from 3 sites) were produced using two of the major raw material types and two of the other types. All six samples were tempered with vegetal matter only.

Open bowls

The open bowls (9 samples from 3 sites) were manufactured using the two major types of raw material at Foeni Gaz, Fratelia and Dudeştii Vechi, and in one case another type of source was utilised. They were mainly tempered with vegetal matter, but a combination of sand and organic temper was also used, and in one case the sample was not tempered[2].

Oval-shaped pots

The oval-shaped pots (13 samples from 2 sites) were manufactured using both the micaceous and very micaceous clay sources at Dudeştii Vechi, and other raw materials such as the non-micritic clay with polycrystalline limestone and shell fragments at Parţa. These vessels were mainly tempered with organic matter only, but in a few cases they also include both sand and vegetal temper, sand temper only, and in two cases no added temper at all.

Flasks

This form is scarcely represented in the samples obtained from sites in Banat. The five samples, from three sites, were made from both the major sources of raw material. All but one was tempered with organics only.

Pedestalled vessels

The three pedestalled pots (from 3 sites) sampled were made using a variety of clay sources and tempers: one of the major raw materials tempered with organics and sand (Dudeştii Vechi), a source rich in clay pellets,

tempered with vegetal matter (Fratelia), and one containing limestone and shell fragments, with no artificial addition of inclusions (Parța).

Conical pots

Conical vessels (5 samples from 3 sites) were mainly made from non-micritic and micaceous sources, tempered with organic matter only or with organics and sand. They were also made using other types of raw material, such as humic and very micaceous clay, tempered with organics.

Carinated vessels

Carinated pots are scarcely represented in the Banat sampling (2 samples from 2 sites). These pots were manufactured using both major sources; both were tempered with vegetal matter only.

Straight deep pots

Deep vessels with straight walls (4 samples from 2 sites) were manufactured from either one of the major sources (humic, non-micritic, micaceous), or with a non humic and very micaceous raw material. In either case they were heavily tempered with vegetal matter.

Indeterminate potsherds

Unfortunately for this type of study, many potsherds analysed were too small to be attributed to a clear typological form. This group of samples includes examples from most of the raw material sources identified, and with or without organic temper. Most of these sherds (25 out of 31) do not show a particular surface treatment, although some of them have impressed motifs. Only five sherds are red-slipped, and one has a polished surface.

Cult objects

Cult objects (6 samples from 5 sites) were mainly produced from less common raw material types. Only an altar foot from Parța (sample PRT26) was made of clay with a non-micritic, micaceous matrix with limestone and

shell fragments naturally present in the fabric, tempered with both sand and organic matter, which was also used to make globular vessels, a pedestalled pot, and an oval vase. The other cult objects analysed do not show a consistent choice of raw material. A "black magic tool" from Parța (sample PRT15) was manufactured using a slightly micritic paste with abundant fragments of polycrystalline limestone and occasional shell fragments, and no temper. Another "black magic tool" (sample FRT35) analysed, from Fratelia, was manufactured with very different technique and material to that of Parța: the potter used a non-micritic and very micaceous clay, heavily tempered with a felspatic sand, rich in micas with thick lamellae.

A bull's head figurine (sample FNS21) from Foeni-Sălaş was manufactured using micaceous and non-micritic clay without temper. The clay used was similar to those exploited for pottery production at the same site, but not identical: it was less humic and richer in clay pellets than that used for the main fabric group (G1, *Spataro M., 2000*, 31) and less micaceous and silty from that used for the second group (G2, *Spataro M., 2005*, 34-35).

A second altar foot (sample FGZ28) from Foeni Gaz was analysed. It was not manufactured from any of the major clay groups: its fabric has a non-micritic, micaceous matrix, with some rounded polycrystalline limestone and shell fragments, which is tempered with vegetal matter. It also shows a red slip. It was made using a similar raw material to that used for the major group of vessels at Foeni Gaz, but the latter does not contain rounded fragments of polycrystalline limestone. On the other hand, shell fragments are not typical of this altar foot only, but they are also present in the raw material exploited for a large globular vessel (sample FGZ18) from the same site (*Spataro M., 2003*). Another altar foot, from Dudeştii Vechi, is made of one of the major clay sources, non-micritic and micaceous, tempered with organic matter, and it can be grouped with an open bowl with red painted surfaces (sample DDV8).

Conclusions

Although the geology of the areas surrounding the sites shows strong similarities, the pottery production from each site has its own characteristics. In the choice of raw materials there is a clear preference towards non-micritic and micaceous clays which were tempered with abundant organic matter.

Nevertheless, in most cases it is possible to suggest local production of the pottery, on the basis of analyses of the soil samples collected in the proximity of each site and their comparison with the fabrics of the ceramics, and of comparisons between the materials from neighbouring sites (e.g. Foeni Gaz and Foeni-Sălaş, *Spataro M., 2005*, 40-41). Though the geology is similar to that of the other sites considered here, the potters at Dudeştii Vechi used slightly different techniques in pottery production, using similar raw materials but tempered with sand richer in coarse grains of quartz and mica, and sometimes containing small rock fragments.

What is apparent from the above discussion is that although various raw materials and techniques were employed in pottery production, it is difficult to detect any correlation between technology and typology. Only the ritual objects were not apparently made from the most common raw material sources, although there are too few samples (6 ritual objects) to be certain that any clay source was used exclusively to make cult objects. Although some of the fabrics of the cult objects analysed (e.g. at Foeni Gaz and Parța) contain shell fragments or polycrystalline limestone, materials which are less common in the fabrics of other artefact types, in at least one case, at Dudeştii Vechi, the clay source used to make an altar foot was also used to make a red-slipped open bowl. Similarly, the clay used to make the altar foot at Parța was also used to make three types of vessels.

From these results, it appears that early Neolithic potters in Banat did not select their raw materials with a mind to the type of clay object they intended to create. Nor can it be shown that there is any correlation between surface treatment and clay source, or between clay source and firing temperature. This does not mean that pottery production was simply a domestic craft, with raw materials selected at random, based on what was most easily obtained. Skilled potters could evidently shape all the vessel types from the same raw materials, following a common formula (*Spataro M., 2003; 2005*, in press). It seems unlikely, however, that any vessel type was not manufactured locally; red-slipped open bowls, for example, were made using the same sources as the most ordinary vessels, which should also be regarded as imports if the monochrome bowls are not produced locally.

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NOTES

1. Sample FGZ12.
2. Sample FGZ17.

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Table 3: Early Neolithic vessels from the 5 sites discussed in the text: fabric groups (G) defined by thin-section petrographic analysis, categorised according to clay matrix type (*Spataro M., 2002*).

Temper type is shown in superscript (^{0}- no added inclusions; ^{1}- organic matter only; ^{2}- sand only; ^{3} - both organic matter and sand added).

site	DDV IIB	DDV IIIA-B	FRT	PRT	FNS	FGZ
non-micritic, micaceous	G1^{3}: G1(a)^{1}: G1(b)^{1}: G1(c)^{1}:	G1^{3}: G1(a) (*iron-rich*)^{1}:	G4^{0}: G4(a)^{1}: G4(b)^{0}: G4(c)^{1}:	G2^{1}: G2(a) (*more mica*)^{1}: G2(b) (*coarser sand*)^{3}: G2(c) (*sandy*)^{1}:		G2^{1}: G5^{1}:
humic, non-micritic, micaceous			G^{1}: G1(a)^{1}: G1(b)^{0}:		G1^{1}: G1(a) (*slightly more micaceous*)^{1}:	G1^{1}: G1(a) (*coarser sand*)^{1}: G1(b)^{0}:
non-micritic, more micaceous	G2^{0}:	G2^{1}: G2(a)^{3}: G2(b) (*limestone*)^{1}:				
non-micritic, very micaceous		G3^{0}:	G5^{0}: G7^{1}:			
non-micritic, micaceous iron-rich, clay pellets			G6^{1}:	G3^{1}:		
non-micritic, micaceous, limestone and shell fragments				G1^{1}: G1(a)^{3}:	G3^{0}:	G4^{0}:
other raw material types	non-micritic, micaceous, limestone G3^{1}:	non-micritic, very micaceous, rock fragments G4^{2}:	more humic, non-micritic, slightly micaceous, scarce quartz G2^{1}: more humic, non-micritic, slightly micaceous, scarce quartz, limestone G3^{1}: G3(a)^{1}: non-micritic, very micaceous, poorly-sorted quartz G8^{2}:	slightly micritic and micaceous, some limestone, occasional shells G4^{0}:	humic, non-micritic, very micaceous G2^{1}: non-micritic, micaceous iron-rich G4^{0}:	non-micritic, silty, slightly micaceous G3^{0}: humic, non-micritic, micaceous with limestone fragments G6^{1}:

Site legend: DDV- Dudeştii Vechi; FRT- Fratelia; PRT- Parţa; FNS- Foeni-Sălaş; FGZ- Foeni Gaz.

Symbols represent the number and typological attribution of sherds sampled from each site and in each fabric group, as follows:

surface treatment	plain or impressed	red-slipped	polished
globular vessel			
short-necked globular vessel			
open bowl			
oval-shaped pot			
flask			
pedestalled vessel			
conical pot			
carinated vessel			
straight deep pot			
sherd indeterminate			
ritual object			

Table 4: Early Neolithic vessels in Banat: summary of the shapes versus fabrics.

raw material type	⦿	◉	◡	○	▥	⅄	▼	⬟	▣	■	✖
non-micritic, micaceous	FRT^{1} PRT^{3}	PRT^{1}	DDV^{1,3} FRT^{0}	DDV^{1,3} PRT^{1}	DDV^{1} PRT^{1}	DDV^{3}	DDV^{1} PRT^{1,3}	PRT^{1}		DDV^{1} PRT^{1} FGZ^{1}	DDV^{1}
humic, non-micritic, micaceous	FRT^{1} FNS^{1} FGZ^{0,1}	FNS^{1}	FRT^{1} FGZ^{1}		FRT^{0,1}			FNS^{1}	FRT^{1} FNS^{1}	FRT^{1} FNS^{1} FGZ^{1}	
non-micritic, more micaceous				DDV^{0,1,3}							
non-micritic, very micaceous	FRT^{0,1}			DDV^{0}					FRT^{1}		
non-micritic, micaceous iron-rich, abundant clay pellets	FRT^{1} PRT^{1}					FRT^{1}				PRT^{1}	
non-micritic, micaceous, limestone and shell fragments	PRT^{1}			PRT^{1}		PRT^{1}				PRT^{1} FNS^{0} FGZ^{0}	PRT^{3}
other raw material types	FRT^{1} FNS$^{1}_{G2}$	FRT^{1} FNS$^{1}_{G2}$	FGZ$^{0}_{G3}$	DDV^{2}			FNS$^{1}_{G2}$			DDV^{1}	FRT^{2} PRT^{0} FNS$^{0}_{G}$ 4 FGZ$^{1}_{G}$ 8
number analysed	54	6	9	13	5	3	5	2	4	31	6

Legend: see caption Table 3.

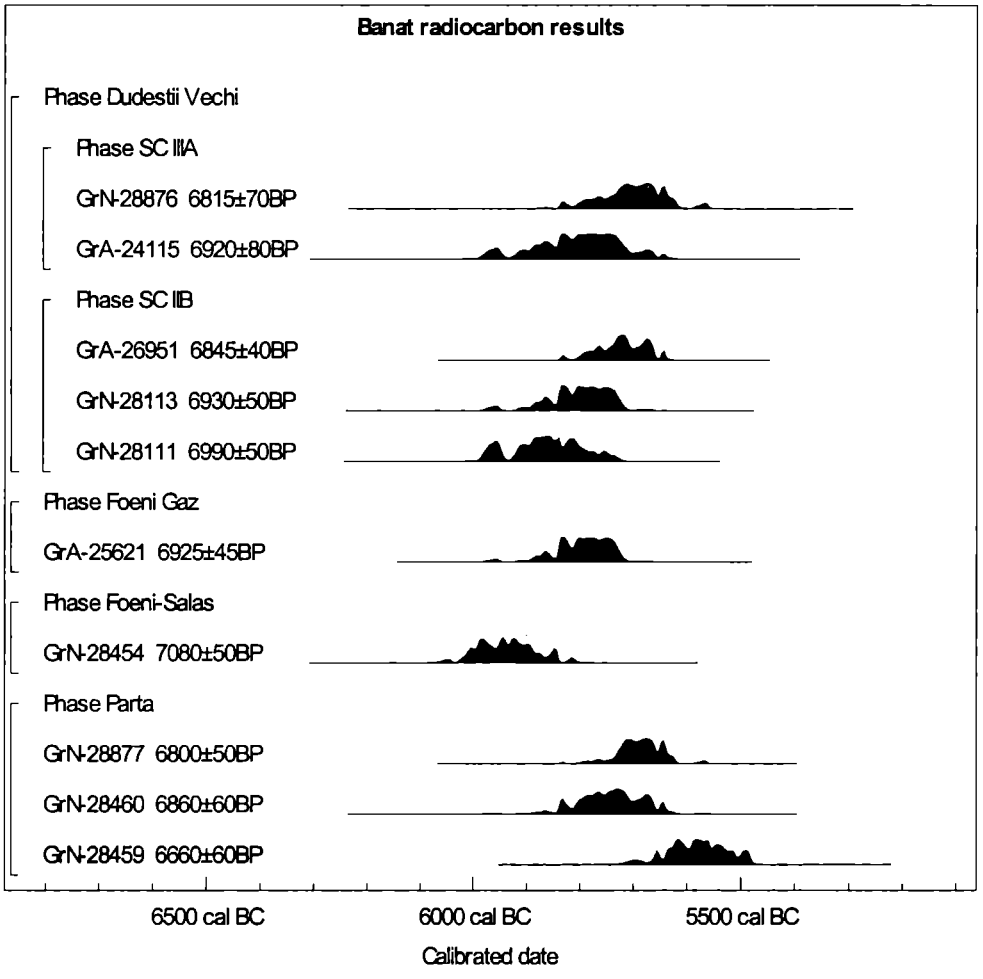

Fig. 1: Banat sites - calibration of the radiocarbon dates.

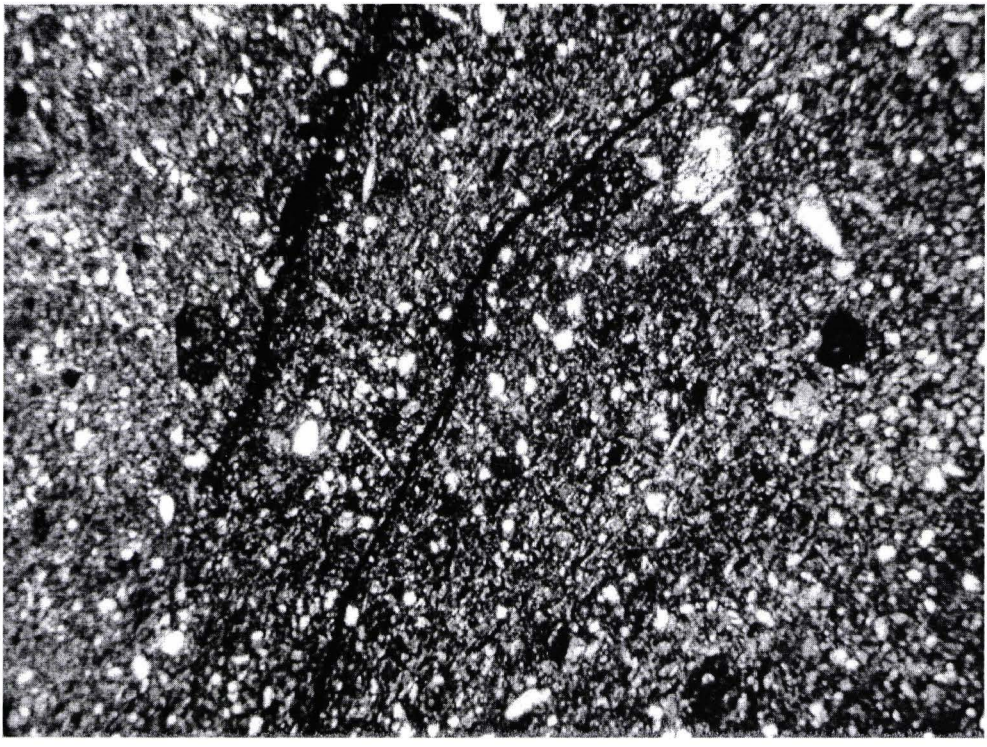

Fig. 2: Fratelia - Photomicrograph of a thin section of sample FRT2 showing a non-micritic and micaceous matrix with abundant fine and well-sorted quartz sand, and organic temper (voids) (N+, 40X: photograph by M. Spataro).