The last phase of the Tripolye Culture in Ukraine: the 2010 field season and the project's conclusive results

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Introduction

The project: *The last phase of the Tripolye Culture in Ukraine: New developments of East/West patterns of human interaction in the 3rd Millennium BC* has concluded with the completion of the 2010 research campaign**.** Thanks to the large amount of data collected during the two previous research campaigns (2008 and 2009) (see Menotti 2009 and 2010), instead of the usual two houses per year, only one (House 44) was excavated in 2010. This enabled us to focus our efforts on more scientific analyses of the data (mainly archaeobotanical remains) collected in 2009. This includes the micro-botanical (pollen) analyses of seven pots found in Houses 42 and 43 (see Fig. 1, Table 1, Table 2 and Fig. 8) during the 2009 excavation campaign, and the ^{14}C dating of charcoal particles, wet-sieved within the stratigraphic sediments of the same two houses. Charcoal remains from a much earlier settlement (Bernashovka 1) located in western Ukraine (Dniester River, Vinnitsa region) have also been dated (Menotti 2010) (see Table 4 and Fig. 9). In addition to discussing the 2010 research season, the paper will provide a brief concluding statement of the results and significance of the project.

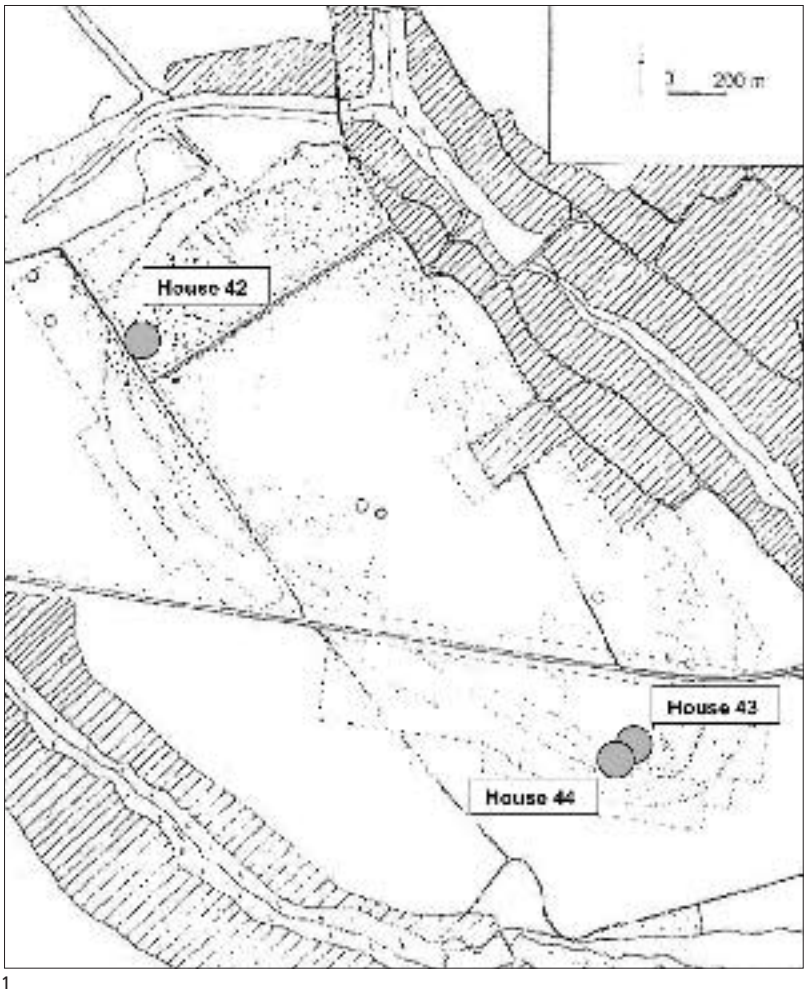

Fig. 1 The layout of the Tripolye Culture giant-settlement of Talianki, with the location of houses 42, 43 and 44

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Fig. 2 The remains of House 44 (Talianki giant-settlement) (Photograph: L. Shatilo, 2010)

Fig. 3 Medium-size cup found in House 44 of the Talianki giant-settlement (Photograph: L. Shatilo, 2010)

Fig. 4 Two small-size cups found in House 44 of the Talianki giant-settlement (Photograph: L. Shatilo, 2010)

Fig. 5 Fragments of amphora-like cups found in House 44 (Photograph: L. Shatilo, 2010)

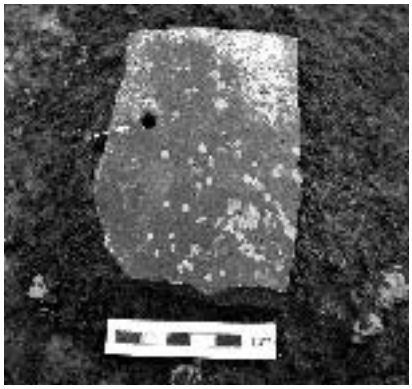
Fig. 6 Zoomorphic figurines found in House 44 (Photograph: L. Shatilo, 2010)

Fig. 7 A fragment of a vessel with signs of repair (e.g. when the vessel cracks into two pieces, a hole is drilled on each side of the crack [see the arrow], and the two fragments are rejoined with thin organic fibres or strings) (Photograph: F. Menotti, 2010)

House 44 in the Talianki giant-settlement

Because of its close proximity to House 43, House 44 was initially thought to be an extension of the former one. However, after its complete excavation and more systematic analyses in 2010, it turned out be a free-standing building. The segment that connected the two dwellings was in fact one of the walls of House 44 which had collapsed in a way that gave the impression that the two houses could have been a single building, possibly belonging to an extended household (see Fig. 2).

Measuring 12×5 metres, House 44 is slightly smaller than House 43, but both have the same structure, layout (location of oven, altar and porch) and entrance orientation. Pottery fragments were quite numerous, and amongst them, a number of complete medium- and small-size ceremonial cups were also found (see Fig. 3 and Fig. 4). In addition to this collection of fairly common pottery, there were also two fragmented Amphora-like cups (Fig. 5). Interestingly enough, no anthropomorphic statuettes were found in this house. However, a few zoomorphic clay figurines were, as usual, located around the altar area (Fig. 6). Finally, as was the case in House 40 (see Menotti 2008: 62–64), there were also potsherds with signs of repair in this house (see Fig. 7), con - firming once again that broken vessels were repaired during periods when pottery was unavailable (e.g. periods when pottery was not manufactured).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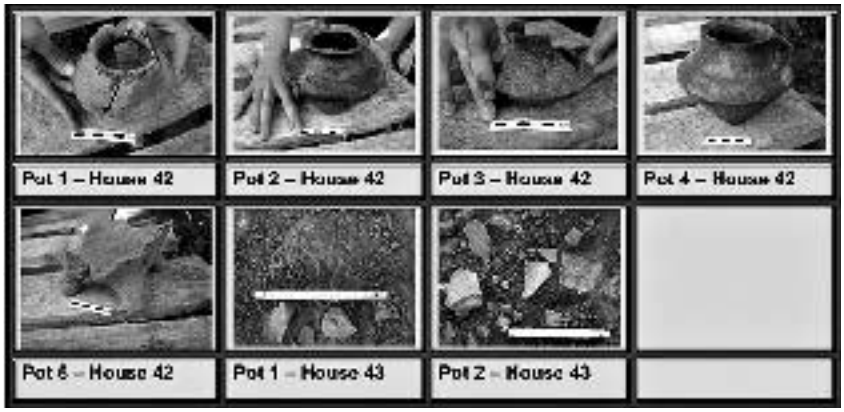

Fig. 8 Pots whose contents have undergone palynological analyses
(Photographs: F. Menotti, 2009)

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Palynological analyses of pot contents (by Lucia Wick)

In 2009, seven complete and/or semi-complete pots (five found in House 42, and two in House 43 – see Tables 1 and 2; and Fig. 8) were selected for palynological analyses of their contents.

Pot 1 – Grid coord.: □-5
Pot 2 – Grid coord.: □-5
Pot 3 – Grid coord.: □-4
Pot 4 – Grid coord.: □-5
Pot 5 (four-legged pot) – Grid coord.: □-5

Table 1 Grid coordinates of complete and semi-complete pots found in House 42

Pot 1 (Outside the house) – Grid coord.: □-10
Pot 2 (Altar) – Grid coord.: □-9

Table 2 Grid coordinates of semi-complete pots found in House 43

The analyses were carried out during the project campaign in 2010. Here are the results:

Sample preparation

Sediment samples of 2–3 ml volume from seven pots were treated using standard methods with HCl 10%, HF 40%, acetolysis and mounted in glycerine. The results in Table 3 are given as pollen counts (c) and pollen percentages (p), where Cichoriaceae, undifferentiated/corroded pollen grains, and fungal spores are excluded from the pollen sum.

Results

The results of the investigations of the pots from houses 42 and 43 are similar to the pollen contents of the pots excavated in 2008 (Menotti 2009). The pollen spectra show a strong dominance of steppic and ruderal plants. Poacea, chenopods, *Artemisia*, and other Asteraceae point to extensively deforested steppe vegetation in the surroundings of the site. Arboreal pollen – mainly represented by pioneers such as hazel *(Corylus)*, birch *(Betula)*, and alder *(Alnus)* – may exist due to regional pollen transport from stands near the river.

Human activity is shown by cereal type pollen grains and indicators of pasture, such as *Plantago*, Fabaceae, and *Anthericum*.

The original content and the use of the pots cannot be reconstructed from the pollen spectra; only the rather high percentages of cereal pollen in Pot 4 (House 42) suggest that the vessel may have contained cereal grains or flour.

In the two pots from House 43, indicators of humidity (Cyperaceae, *Ranunculus*, Polypodiaceae etc.) and nutrient-rich soils *(Xanthium, Carthamus, Convolvulus)* occur with higher values than in House 42. Additionally, Pot 43/1 is rich in fungal spores *(Sordaria, Gelasinospora, Coniochaeta ligniaria)* that are connected to humid organic matter and/or dung. These differences may point to a different environment or a different use of the two houses, i.e. livestock farming in the area of House 43 (see also Table 3).

Table 3 Palynological analyses of pot contents found in Houses 42 and 43 (Table: Lucia Vick)

TALIANKI POTS 2009 (Palynological analyses of pot contents - 2010)

House no.	42										43			
Sample	Pot 1		Pot 2		Pot 3		Pot 4		Pot 5		Pot 1		Pot 2	
c = counts, p = percentages	c	p	c	p	c	p	c	p	c	p	c	p	c	p
Trees and Shrubs														
Corylus	12	**6.6**	10	**5.7**	8	**3.0**	15	**5.6**			15	**3.9**	9	**2.4**
Betula	1	**0.6**	3	**1.7**	1	**0.4**	5	**1.9**			4	**1.0**	2	**0.5**
Alnus glutinosa type	3	**1.7**	5	**2.9**	5	**1.9**	5	**1.9**			7	**1.8**	3	**0.8**
Fraxinus excelsior	1	**0.6**	2	**1.1**	1	**0.4**	1	**0.4**	**no pollen**				1	**0.3**
Quercus robur t.	4	**2.2**	5	**2.9**	6	**2.2**	3	**1.1**			7	**1.8**	11	**3.0**
Tilia	3	**1.7**	7	**4.0**	6	**2.2**	3	**1.1**			5	**1.3**	2	**0.5**
Ulmus							1	**0.4**			1	**0.3**		
Acer														
Fagus					1	**0.4**	1	**0.4**						
Pinus sylvestris type	9	**5.0**	11	**6.3**	9	**3.3**	3	**1.1**			22	**5.8**	15	**4.1**
Total trees and shrubs	***33***	***18.2***	***43***	***24.7***	***37***	***13.8***	***37***	***13.9***			***61***	***16.0***	***43***	***11.7***
Cultivated plants														
Cerealia type	1	**0.6**	10	**5.7**	11	**4.1**	42	**15.8**			21	**5.5**	18	**4.9**
Steppic and ruderal plants														
Poaceae	28	**15.5**	33	**19.0**	43	**16.0**	47	**17.7**			42	**11.0**	30	**8.2**
Artemisia	51	**28.2**	42	**24.1**	89	**33.1**	67	**25.2**			76	**19.9**	46	**12.5**
Achillea type	5	**2.8**	2	**1.1**	2	**0.7**	1	**0.4**			4	**1.0**	8	**2.2**
Asteraceae undiff.	15	**8.3**	14	**8.0**	19	**7.1**	7	**2.6**			23	**6.0**	22	**6.0**
Centaurea solstitialis type	5	**2.8**	4	**2.3**	9	**3.3**	7	**2.6**			11	**2.9**	2	**0.5**
Arctium	3	**1.7**	1	**0.6**										
Xanthium											6	**1.6**	3	**0.8**
Carthamus											8	**2.1**	8	**2.2**
Chenopodiaceae	10	**5.5**	13	**7.5**	22	**8.2**	33	**12.4**			40	**10.5**	38	**10.3**
Polygonum aviculare type			1	**0.6**	1	**0.4**	5	**1.9**			1	**0.3**		
Convolvulus arvensis type											2	**0.5**	2	**0.5**
Mercurialis annua			2	**1.1**	1	**0.4**	3	**1.1**						
Anemone type													8	**2.2**
Plantago sp.	3	**1.7**	2	**1.1**	4	**1.5**	1	**0.4**			9	**2.4**	7	**1.9**
Rumex acetosella type											1	**0.3**		
Rubiaceae	3	**1.7**	2	**1.1**	2	**0.7**					6	**1.6**	4	**1.1**
Fabaceae	3	**1.7**	1	**0.6**	2	**0.7**	1	**0.4**						
Onobrychis type											2	**0.5**		
Brassicaeae							1	**0.4**			9	**2.4**	1	**0.3**
Anthericum											1	**0.3**	1	**0.3**
Thalictrum			1	**0.6**	1	**0.4**								
Caryophyllaceae undiff.			1	**0.6**	2	**0.7**	1	**0.4**			2	**0.5**	3	**0.8**
Apiaceae undiff.	3	**1.7**	3	**1.7**	9	**3.3**	5	**1.9**			11	**2.9**	3	**0.8**
Cichoriaceae	37	**20.4**	32	**18.4**	62	**23.0**	43	**16.2**			151	**39.5**	214	**58.2**
undiff./corroded	17	**9.4**	19	**10.9**	14	**5.2**	7	**2.6**			11	**2.9**	10	**2.7**
Indicators of humidity														
Mentha type											1	**0.3**	2	**0.5**
Potentilla type	1	**0.6**					1	**0.4**						
Ranunculus undiff.											1	**0.3**	1	**0.3**
Cyperaceae					1	**0.4**					2	**0.5**	5	**1.4**
Polypodiaceae											1	**0.3**	2	**0.5**
Fungal spores														
Sordaria											13	**3.4**		
Sporormiella													1	**0.3**
Gelasinospora											1	**0.3**		
Coniochaeta ligniaria											15	**3.9**	3	**0.8**
Pollen sum excl. Cichoriaceae, undiff. and fungal spores	**164**		**175**		**254**		**258**				**331**		**257**	

Fig. 9 Calibration plots, showing the calendar age ranges. a) Bernashovska; b) Talianki House 42; and c) Talianki House 43

Radiocarbon (^{14}C) dating of charcoal remains

As specified in last year's report (Menotti 2009), a selection of charcoal particles found in House 1 (Bernashovka 1, Dniester region) and Houses 42 and 43 of the Talianki giant- settlement (see Table 4) were sent to the AMS laboratory in Oxford for ^{14}C dating. The decision to include a sample from Bernashovska 1 was made in order to shed more light on the absolute early Tripolian chronologies in western Ukraine, which will be eventually linked to later ones in the western part of the country.

The purpose of obtaining ^{14}C dates from various Tripolye Culture settlements (from the Dniester to the Dneper [also spelt Dnieper]) is to develop an absolute chronology (presently still at an infancy stage within the Tripolian research in Ukraine), which will be subsequently compared to the already well-established relative one (based on pottery typology) (Passek 1949; Ryzhov 1993). A better control over chronological developments will improve our understanding of initial eastward migrations and the consequent development of western Tripolye local groups, which are responsible for the expansion and subsequent decline of the giant-settlements between the Southern-Bug and the Dneper region (Kruts, 2008; Ryzhov, 2008).

Results:

Sample	OxA	Geog.-Coord.	Wood species	□^{13}C	Date
Bernashovka 1 House 1	OxA-22516	Lat 48° 34′ 04″N Long 27° 28′ 06″E	Oak *(Quercus)*	-22.78	5772±30
Talianki House 42	OxA-22348	Lat 48° 48′ 22″N Long 30° 31′ 30″E	Oak *(Quercus)*	-24.12	5032±31
Talianki House 43	OxA-225150	Lat 48° 47′ 33″N Long 30° 33′ 14″E	Ash *(Fraxinus)*	-24.22	4976±29

Table 4 Charcoal samples ^{14}C dated by the AMS laboratory in Oxford

The dates listed in Table 4 are uncalibrated in radiocarbon years BP (Before Present–AD 1950) using the half life of 5568 years. Isotopic fractionation has been corrected for using the measured □^{13}C values measured on the AMS. The quoted □^{13}C values are measured independently on a stable isotope mass spectrometer (to ±0:3 per mil relative to VPDB) (for details of the chemical pre-treatment, target preparation and AMS measurement, see Tripp *et al.* 2004).

Subsequently, the dates have been calibrated using the Oxcal computer program (v4.1.5) of C. Bronk Ramsey and the «INTCAL09» dataset (Reimer *et al.* 2009). With a probability of 95.4%, the date range of Bernashovska 1 is set between 4704 and 4546 cal BC; whereas the two houses of Talianki are much younger: between 3947 and 3760 cal BC with a probability of 90.9% for House 42, and between 3801 and 3692 cal BC for House 43 (see Fig. 9).

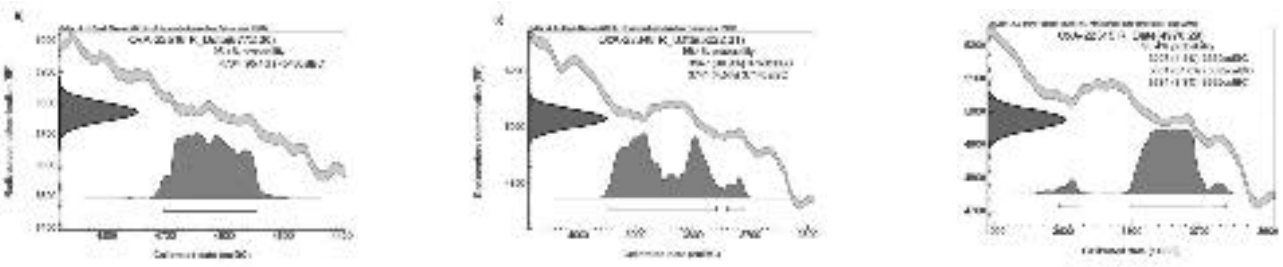

Fig. 9

Conclusions (the 2010 campaign)

In addition to the excavation of House 44 in the southern part of the giant-settlement of Talianki, the 2010 research campaign was mainly focused upon scientific analyses of material collected during the previous year's campaign (2009). Palynological analyses were carried out on the seven pots found in Houses 42 and 43; and ^{14}C dating was performed on charcoal particles wet-sieved from sediments of the same two houses, plus some from Bernashovska 1, a much earlier settlement in western Ukraine.

Microbotanical studies (pollen) were quite rewarding, pointing out different agricultural activities in the village, which was surrounded by an extensively deforested steppe vegetation. The ^{14}C dates from Bernashovska 1 and Houses 42 and 43 in Talian - ki confirmed new theories, at the same time throwing interesting light on recently developed ones (see final remarks below).

Final remarks and significance of the project

Thanks to the effective synergetic collaboration with Ukrainian colleagues, the help of a large number of hard-working students from three Ukrainian universities and the availability of skilled local labour force, the amount of data collected within the three field campaigns of the project exceeded all expectations! Five houses from the largest giant-settlement (Talianki) of the Ukrainian Tripolye Culture have been fully excavated and analysed. The main focuses of the project have been placed upon four core research areas: a) the chronological development of the ceramic decoration within the Talianki settlement; b) macro and micro-botanical analyses of wet-sieved stratigraphic units (with a special emphasis placed upon pollen analyses of complete pots); c) the absolute dating of charcoal remains collected from stratigraphic sediments within the various excavated houses (40, 41, 42 and 43); and finally, d) an extensive literature review of a large number of publications and reports in Russian and Ukrainian. The key question of the study was to shed light on the east-west chronological migration of the Ukrainian Tripolye Culture, concentrating our attention in particular on the formation and decline of the so-called giant-settlements, which are characteristic of the area between the Southern Bug and the Dnepr River. Key issues were mainly linked to migration processes, landscape studies, the accessibility and sustainability of natural resources (e.g. pastoral land, tillable soil and forest management in connection with timber availability), and the demographic development of the population. This all helped to identify possible causes of the continuous migration process of local Tripolye groups, their interaction with other populations, and finally the inexorable decline of the Tripolye Culture in the Ukraine during the second half of the fourth millennium and the very beginning of the third millennium BC. The perpetual eastward migration process and the formation of the two Tripolian Culture contemporaneous traditions (east and western traditions) were clearly identified. However, major questions still remain. For instance, were some of the giant-settlements in the Southern Bug and the Dnepr River region contemporaneous? Were the settlements abandoned in one go (e.g. setting them entirely on fire at the end of the occupation, symbolising their killing – as some scholars believe – see Burdo 2003, 2007; Kruts, 1989, 2003; Korvin-Piotrovskiy and Menotti 2008), or was it more a continuous rotating process of migrating, developing the settlements and abandoning them (hence the ritual process of burning would encompass only a few houses at any given time)?

Both the above-mentioned palynological analyses and the absolute dating of the house remains within the Talianki giant-settlement have shed considerable light on this issue. Although relative chronology (based on pottery style and decorations) excellently highlights the chronological order of the various migrating processes, it is not able to spot the internal evolution of the single settlements. High-resolution ^{14}C dates in this case help identify the chronological construction of houses, especially in such a large village as the Talianki settlement. For instance the dates from the two Houses 41

[3956–3766 cal BC] and 42 [3947–3760 cal BC]) of the northern side of the settlement seem to reflect contemporaneity, but they were built well before the one in the southern part of the settlement (House 43 [3801–3692 cal BC]). This may show that the northern part of the settlement was developed beforehand, as people were moving in from another settlement, whereas the southern quarters were built later on. This rotation process might have also reflected the abandonment, which probably did not occur in one event, but also in this case took place over a reasonably long period of time.

This hypothesis is sustained by microbotanical analyses, which confirm the presence of steppe vegetation and patches of degenerated woodland, that may have been large enough to provide wooden material for house construction and fuel. The same could be said for the fertility of the soil, which due to intense exploitation (one has to take into account that at some stage more than 5000 people occupied the settlement of Talianki – see Kruts, 2008), it might have become exhausted, hence forcing people to migrate in search for new tillable land.

Despite the above-mentioned positive results, one straight answer as to why the Tripolye Culture collapsed after more than two millennia of development cannot unfortunately be given. In addition to the environmental issues, which so far have dominated the archaeological reasoning, those concerning social organisation and interaction seem now to have played a much more important role. As Lucia Vick suggests, more archaeobotanical analyses of the giant-settlement area (including deep cores in wetland environments – e.g. lakeshores, riverbanks and marshlands), and more absolute dating of the various settlements (and houses with them) are needed to gain a better understanding of the complex relationship people-environment. This may in fact hold the «real» secret of the inexorable decline of a great prehistoric culture such as the Tripolye!

Finally, one of the major achievements of the project is in fact linked to its title. More absolute dating carried out during the project, their link to other chronological charts and most importantly, a comparative study with the well-established relative chronologies based on pottery typology has confirmed a rather earlier development of the various events. Instead of the 3rd millennium cal BC (as pointed out in the title), we can now speak of the 4th millennium cal BC as the most important period (beginning of the regional migrations, development and initial decline) for the Tripolye Culture in the Ukraine. Concerning the final decline (the very end) of the Tripolye Culture, the chronology is still unclear – it is however possible that also the very beginning of the 3rd millennium cal BC could be included in the equation.

In terms of publications, the project has not only generated the three reports in the *SLSA Jahresbericht*, but also three papers in a Ukrainian journal (Kruts 2008, 2009 and in the press). However, the main achievement is the edited book (Menotti and Korvin-Piotrovskiy eds.), which consists of a collection of chapters written by various scholars involved in the project. This will discuss the state-of-the-art research in the Tripolye Culture studies, as well as highlighting the various research topics investigated throughout the project. The book is due to be published in 2012.

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