

**THE FOUNDATIONS OF RADIOCARBON  
CHRONOLOGY OF CULTURES BETWEEN  
THE VISTULA AND DNEIPER:  
3150-1850 BC**

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Vadim V. Skripkin  
Marzena Szmyt  
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## Editor's Foreword

This volume of the *Baltic Pontic Studies* focuses on the results of the research carried out so far into the absolute (radiocarbon) chronology of the area lying between the Vistula and Dnieper or the bio-cultural borderland between the West and East of Europe. Absolute chronology is treated here both as a research goal and fundamental premise in the broader studies of the chronometric and development synchronization of "borderland" cultural systems. In a series of articles devoted to individual taxa a considerable number of new  $^{14}\text{C}$  dates have been compared. The dates concern source materials that have been chosen from the point of view of their representativeness and chronometric value ("short-lived" materials were preferred to minimize a potential error). The vast majority of analyses were purposefully made in the same  $^{14}\text{C}$  laboratory of the *State Scientific Center of Environmental Radiogeochemistry of Ukrainian Academy of Sciences* in Kiev taking advantage of funds generously provided by the *Polish Committee for Scientific Research*.

The volume devoted to the "dark" section of the "borderland" history (3150-1850 BC) is the first but not the last publication on the broader issues mentioned above that we intend to present in the near future.

## Editorial comment

1. All dates in the B-PS are calibrated [see: Radiocarbon vol.28, 1986, and the next volumes]. Deviations from this rule will be point out in notes.
2. The names of the archaeological cultures and sites are standarized to the English literature on the subject (e.g. M. Gimbutas, J. P. Mallory). In the case of a new term, the author's original name has been retained.
3. The spelling of names of localities having the rank of administrative centres follows official, state, English language cartographic publications (e.g. *Ukraine, scale 1 : 2 000 000*, Kiev: Mapa LTD, edition of 1996).

**Marzena Szmyt**

## TRIPOLYE TRAITS IN THE MATERIALS OF CENTRAL (POLISH) GROUP OF THE GLOBULAR AMPHORA CULTURE — A RADIOCARBON PERSPECTIVE

The question of contacts between the Globular Amphora culture (GAC) and the Tripolye culture (TC) societies has occupied scholars for a long time. They have mainly focused, however, on the eastern group of the GAC and the forest-steppe TC structures. The character of relationships between the two units has been assessed in most cases on the unreliable basis of the co-occurrence of the materials of both cultures on the same sites (especially, the presence of GAC ceramics at Tripolye settlements) [e.g. Passek 1949:222; Sulimirski 1959:279; Sveshnikov 1983:18]. Conclusions drawn from such data have led, for instance, to a wrong synchronization of the GAC with stage CI of the TC [e.g. Sulimirski 1959:167; cf. polemics in: Zbenovich 1976:46]. At present, the data is being expanded to include more convincing evidence of the partial contemporaneity of both cultures and direct contacts between their populations [e.g. Movsha 1985a; Szmyt 1999b]. Relying on still rather rare cases of the co-occurrence of GAC and TC traits and the current version of the chronology of both cultures [Videiko, Radiocarbon. . . , in this volume], one may justifiably accept a thesis about (partial?) the contemporaneity of the GAC and Late Tripolye groups of phase CII [Movsha 1985a:29].

As T.G. Movsha [1985a:28] stressed it, between the TC and GAC there had been no neutral zone. There is no doubt that areas occupied by GAC settlement in the forest-steppe zone had been earlier, and at least for some time contemporaneously, occupied by Late Tripolye groups (especially Gorodsk-Kasperovtsy group). What is stressed in this context is the different character of many aspects of life of people of both cultures [Gimbutas 1991]. However, to view the relationships between the societies solely from the point of view of their possible competition (or even strife) [e.g. Sulimirski 1970:166; Zakharuk 1971:179; Zbenovich 1976:46] would be premature.

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\* Project was financed in part with grant no. 1H011g01810 provided by the Polish Committee for Scientific Research in 1996-1998.

Much less attention has been given to the question of the presence of Tripolye traits within the central (Polish) group of the GAC. The list of possible identifying markers was rather short with the most important being vessel ornamentation with two-strand cord impressions. The acceptance of the hypothesis about the Pontic origin of this type of ornamentation in the Funnel Beaker culture (FBC) [Kośko 1981:99-101] led to the conclusion that analogous ornamentation in the GAC had a similar origin (via the FBC) [Kośko 1991b:94, Czebreszuk, Szmyt 1992:116-117].

Now, thanks to the most recent results of field research we have an entirely new category of sources testifying to mutual contacts between TC societies and those of the central GAC group. These are vessels with traces of intentional coloring of the outer surface which have been identified within the Kujawy GAC agglomeration [Szmyt 1996a].

## 1. CATALOGUE OF SOURCES

The sources currently consist of fragments of six vessels recorded at four archaeological sites: Bożejewice 22, Kuczkowo 1, Piecki 8, and Żegotki 2. The pottery has been subjected to physicochemical analyses that helped identify dyes and determine their properties [Langer, Pietrzak 1999; Langer, Szmyt 1999]. The context of each find has been discussed in detail in source publications [Szmyt 1998; 1999a].

**A.** Bożejewice, Kujawy — Pomorze Prov., site 22, feature A10. In a pit [Szmyt 1999a], a belly pottery fragment was recorded. On its outer surface, a thin layer of dark dye was macroscopically identified (Fig. 1:a). The burning of the fragment prevents any assessment of the technology used to make it. The dye was subjected to physicochemical analyses [Langer, Pietrzak 1999] which showed it to be a highly carbonized substance [“having a low content of organic compounds built of saturated hydrocarbon groups”] whose characteristics differed from those of wood tar or bituminous materials. Nevertheless, the dye was found to have been obtained “in a process similar to that in which wood tar is obtained and used” [Langer, Pietrzak 1999]. The dye was treated with high temperature (most probably the technology of “thermal stabilization of the dye layer”) [Langer, Pietrzak 1999].

**B.** Bożejewice, Kujawy — Pomorze Prov., site 22, feature A2. In a pit [Szmyt 1999a], a belly pottery fragment was recorded. On its outer surface, a thin layer of reddish-brown substance was macroscopically identified (Fig. 1:b). The vessel had been made according to a formula known as technological group IIIB1 [Szmyt

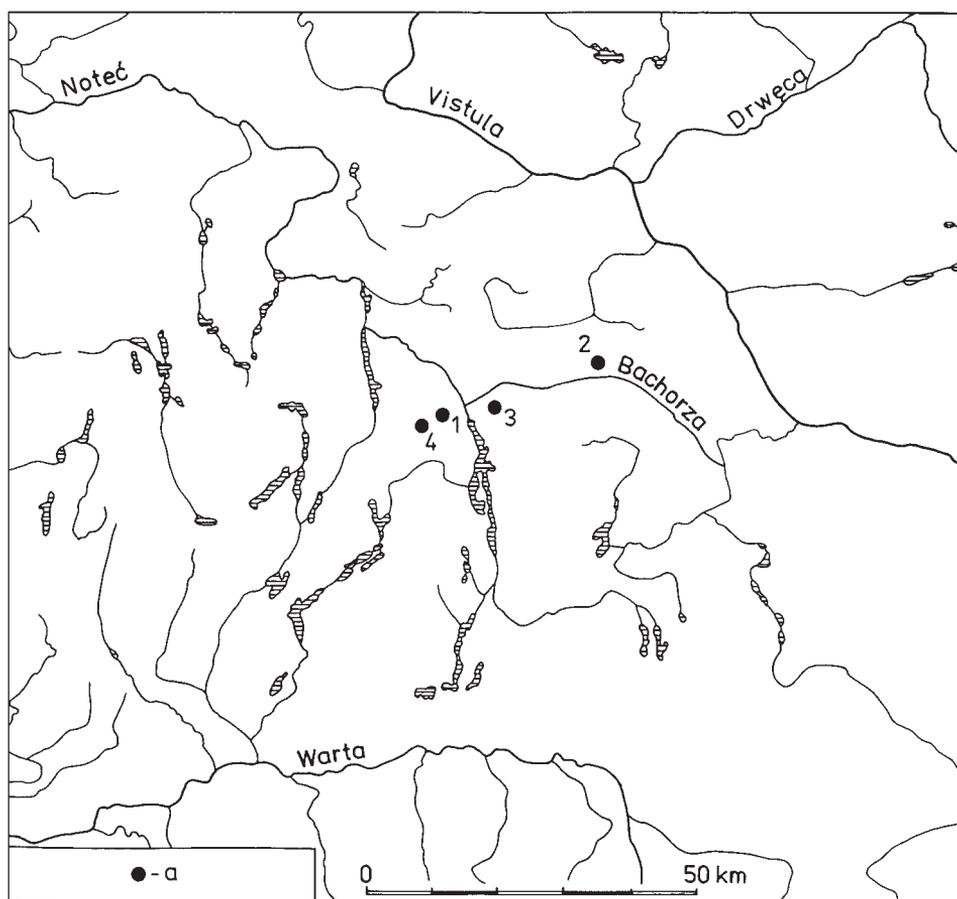


Fig. 1. Location of Globular Amphora culture sites displaying "Tripolye" traits in Kujawy.  
 1 - Bożejewice, Kujawy - Pomorze Prov., site 22, 2 - Kuczkowo site 1, 3 - Piecki site 8, 4 - Żegotki site 2

1996:26-27], i.e. containing leaning temper consisting of coarse crushed stone and fine and medium grain sand, which are readily visible in the compact fracture. The results of physicochemical analyses showed the dye to be a mineral substance made on the basis of iron oxides "which are transformed into a durable red compound,  $\text{Fe}_2\text{O}_3$ , known as hematite, when pottery is fired in oxidizing conditions" [Langer, Szmyt 1999]. The dye was spread over a specially prepared beige ground made from ceramic material in the process of firing thanks to appropriate thermochemical treatment [Langer, Szmyt 1999].

C. Kuczkowo, Kujawy — Pomorze Prov., site 1, feature A136. In the upper portions of the deposits covering a ritual feature containing a cattle burial on its bottom

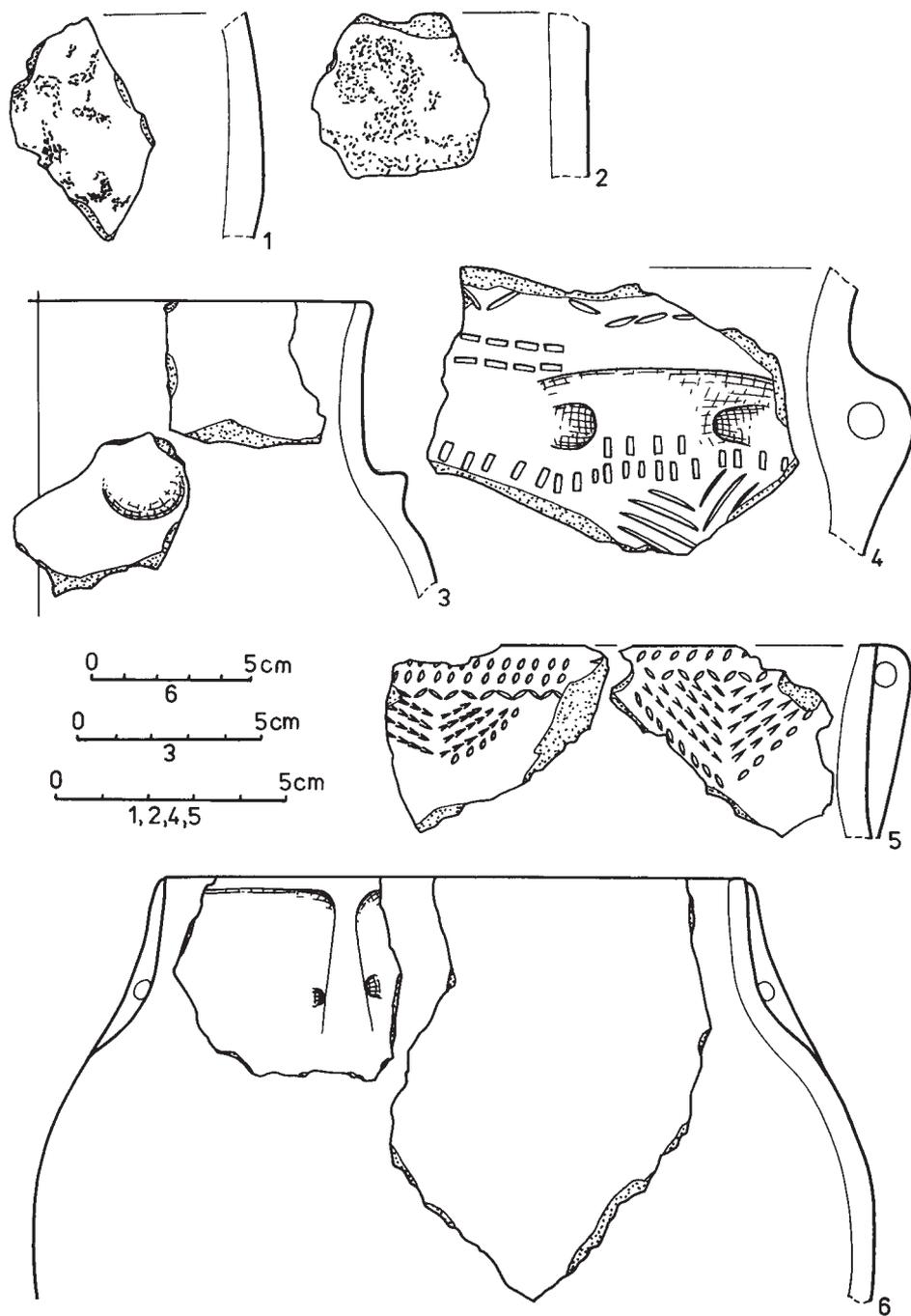


Fig. 2. Bożejewice Kujawy-Pomorze Prov., site 2. A selection of Globular Amphora culture pottery from features A2(1) and A10 (2-9). 1 - fragment with black dye, 2 - fragment with red dye

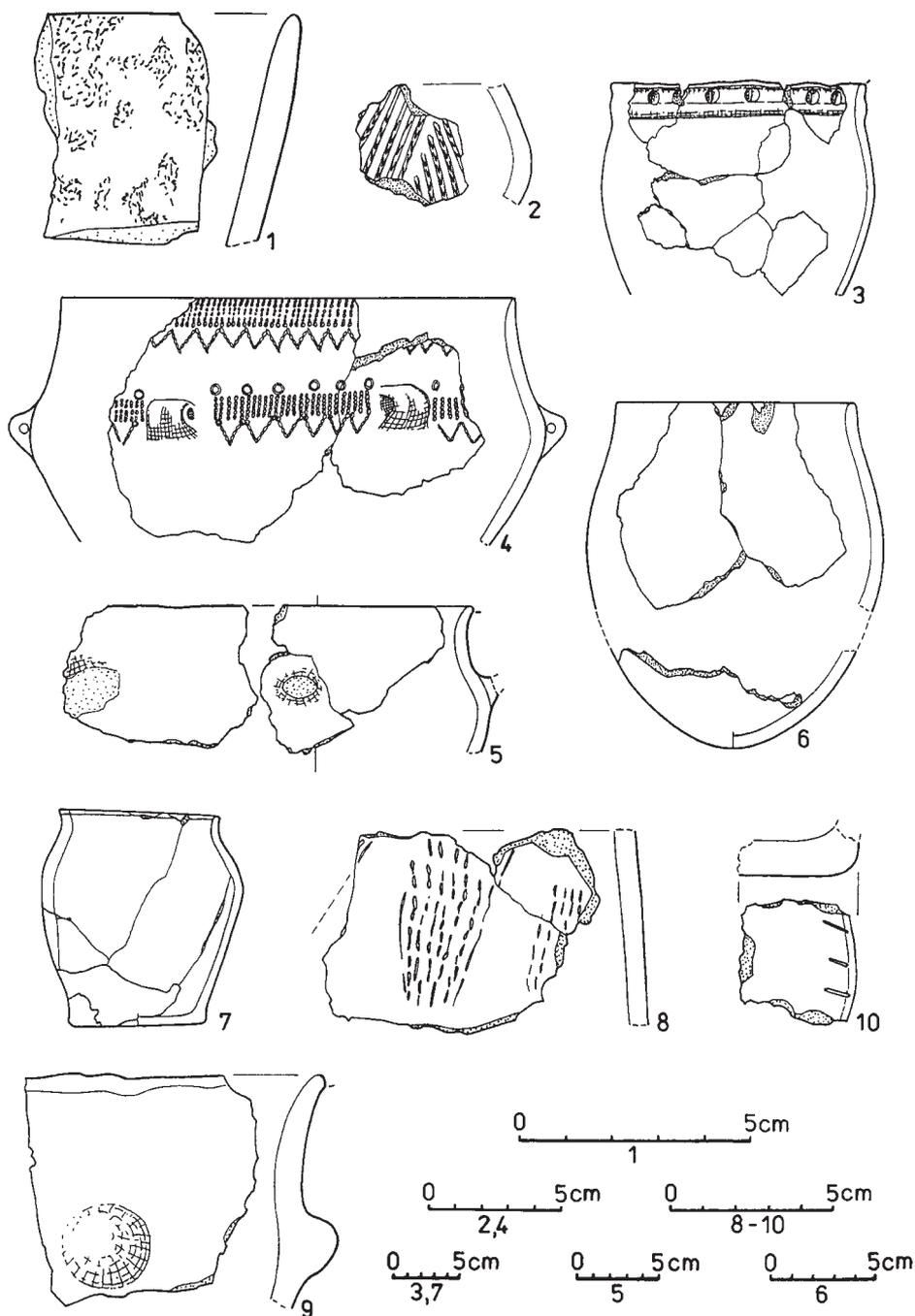


Fig. 3. Kuczkowo Kujawy - Pomorze Prov., site 1. A selection of Globular Amphora culture pottery from feature A136. 1 - fragment with black dye

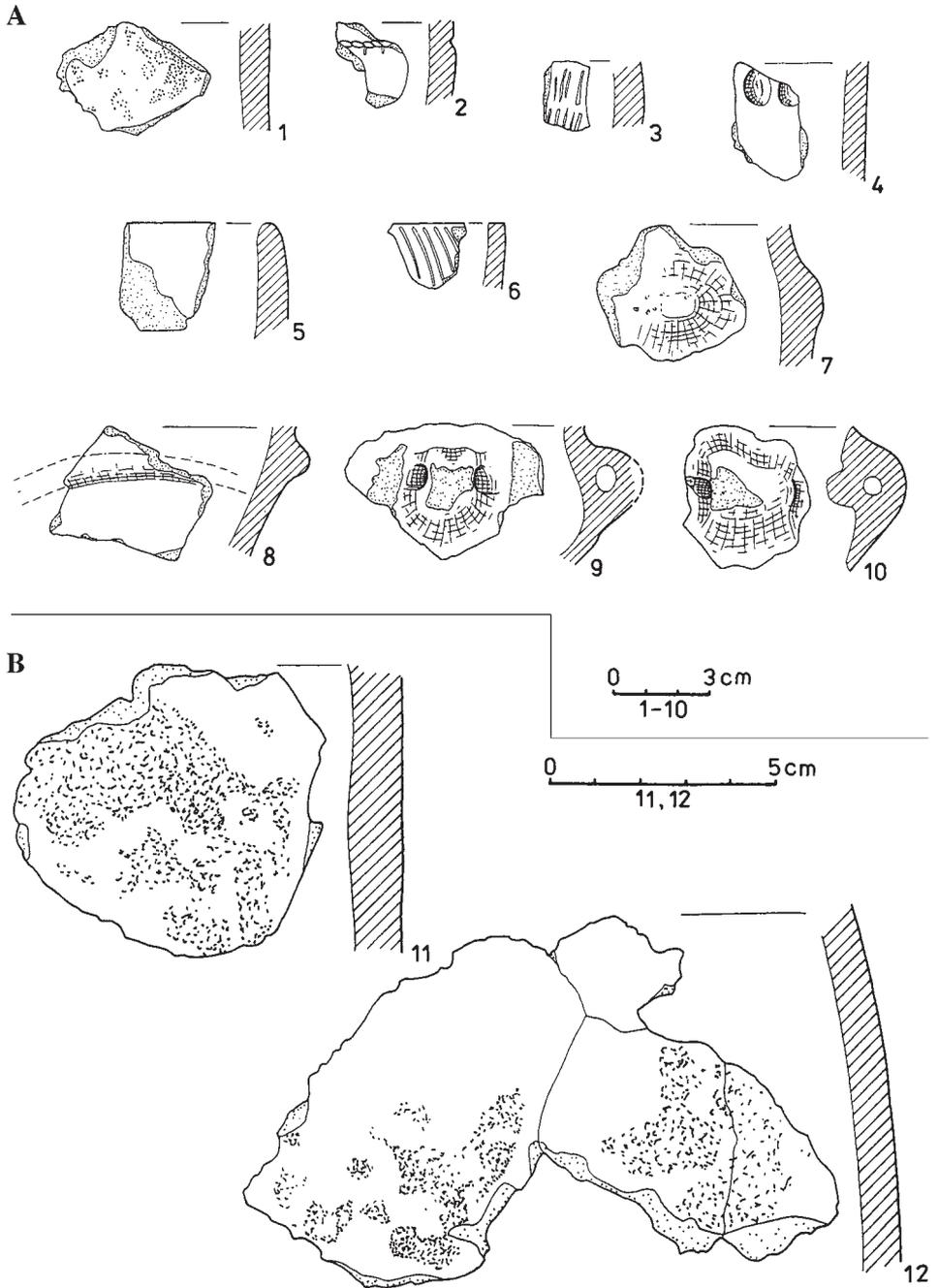


Fig. 4. A. Piecki Kujawy - Pomorze Prov., site 8. A selection of Globular Amphora culture pottery from feature 18. 1 - fragment with red dye; B. Żegotki, site 2, excavation B1a. Pottery fragments with red dye

[Szmyt 1999a], a pottery fragment with a thin layer of black dye on its outer surface was found (Fig. 1:c). The vessel had been made according to a formula known as technological group IIIb1 (cf. item B above). The partially preserved rim of the vessel belongs to type 1e [Koško 1981:32-33], i.e. it has straight walls and an arched top. The dye was identified using physicochemical analyses to be analogous to that in the case of fragment A [Langer, Pietrzak 1999].

**D.** Piecki, Kujawy — Pomorze Prov., site 8, feature 18. In deposits covering a grave [Szmyt 1998], a fragment of a vessel belly was found. On its outer surface, it bore traits of reddish-brown dye (Fig. 1:d). The vessel had been made according to a formula known as technological group IIIb1 (cf. item B above). Physicochemical analyses confirmed the macroscopic identification of the dye which turned out to be a mineral substance having similar properties to those in the case of fragment B. The only difference is the fact that the bright (beige) ground was purposefully spread over the gray ceramic material as an “additional thin layer on the surface of a preliminarily fired vessel” [Langer, Szmyt 1999].

**E.** Żegotki, Kujawy — Pomorze Prov., site 2, excavation B1a. In the slopewash covering the upper portions of the excavation, underneath a thicker layer of humus [Szmyt 1999a], seven belly fragments of the same vessel were recorded. On its outer surface, a red substance was found (Fig. 1:e). The vessel was made according to the formula known as technological group IIIB2, i.e. with temper of coarse broken stone, plant admixture and fine/medium grain sand; its fracture was stratified. One of the fragments was analyzed physicochemically to find out if the macroscopic identification of the dye was correct. It turned out to be a mineral substance of analogous properties to those in the case of fragment B [Langer, Szmyt 1999]. The dye was spread on a brown ground obtained from a ceramic material during the process of firing.

**F.** Żegotki, Kujawy — Pomorze Prov., site 2, excavation B1a. In the same stratigraphic location as fragment E, remains of another vessel were found. Their outer surface was covered with a red substance as well (Fig. 1:f). The vessel was made according to formula IIIB1 (see item B above). In this case, too, physicochemical analyses confirmed the macroscopic identification of the dye which was found to be a mineral substance whose properties were analogous to those of fragment B [Langer, Szmyt 1999].

As it can be seen from the above information, in the analyzed sources organic and mineral dyes were identified. The former were made from materials related to wood tar [Langer, Koško 1986], while the latter were based on iron oxides. Being relatively badly damaged, the colored surfaces prevent identification of any ornamentation patterns. What can only be ascertained is the fact that dyes were used to color edge or belly portions of vessels.

## 2. CHRONOLOGICAL ANALYSIS

The sources presented in the first part come from settlement (A, B), sepulchral (D) and other ritual (C) features as well as from a “cultural layer” (E, F). In all the cases, it is possible to determine the relative chronology of respective features [Szmyt 1998; 1999a]. In particular, three of them (Bożejewice 22, features A2 and A10 and Kuczkowo 1, feature A136) may be related to phase IIb of GAC settlement according to the Kujawy periodization [Szmyt 1996: 34-35], one (Piecki 8, feature 18) to phase IIIa, while the “cultural layer” from Żegotki 2 may be associated with phases IIb-IIIa. These chronological assessments are borne out and adjusted by a series of radiocarbon datings presented in Table 1.

Table 1

<sup>14</sup>C datings related to GAC features containing painted pottery. Calibration using Weninger 1993

No.	Locality	Feature	Phase	Type of feature	Material	Lab. no.	Conv.bp	Cal BC [Weninger 1993]
1	Kuczkowo 1	C2	IIb	ritual	bones	Ki-6920	4525±45	3200±95
2	Kuczkowo 1	C2	IIb	ritual	bones	Ki-6496	4520±45	3203±95
3	Kuczkowo 1	C2	IIb	ritual	bones	Ki-6919	4490±40	3226±98
4	Kuczkowo 1	C2	IIb	ritual	bones	Ki-6921	4480±40	3209±106
5	Kuczkowo 1	A136	IIb	ritual	bones	Ki-6927	4420±55	3010±105
6	Kuczkowo 1	A136	IIb	ritual	bones	Ki-6917	4415±45	3003±81
7	Kuczkowo 1	A136	IIb	ritual	bones	Ki-6929	4400±50	2994±76
8	Kuczkowo 1	A136	IIb	ritual	bones	Ki-6928	4385±45	2977±62
9	Kuczkowo 1	A136	IIb	ritual	bones	Ki-6926	4370±50	2974±62
10	Bożejewice 22	F44	IIb	pit	bones	Ki-6913	4335±40	2946±53
11	Bożejewice 22	A2	IIb	ritual	bones	Ki-6914	4305±45	2929±57
12	Bożejewice 22	A3	IIb	pit	bones	Ki-6912	4275±45	2843±78
13	Piecki 8	16	IIIa	pit	bones	Ki-5681	4270±30	2891±37
14	Piecki 8	13	IIIa	pit	bones	Ki-5680	4230±25	2819±65
15	Piecki 8	18	IIIa	grave	bones	Ki-6513	4105±40	2594±108
16	Żegotki 2	A68	IIIa	pit	bones	Ki-6220	4150±45	2740±101
17	Żegotki 2	A113	IIIa	ritual	bones	Ki-6221	4030±60	2539±81

**Bożejewice 22.** Both features (A2 and A10) are related to the same settlement phase, identified at the site, to which three datings refer including one from feature A2 (Table 1). A joint calibration [Weninger 1993] of the three datings gives a fully

legitimate result indicating that the settlement was occupied about 2897 BC (1 $\Sigma$  interval of 3000-2880 BC) [Szmyt 1999a]. It is also this chronology that can be ascribed to the discussed pottery fragments.

**Kuczkowo 1.** For the bones of an animal buried at the bottom of feature A136, five datings were obtained (Table 1), the joint calibration of which sets the time of ca 3031 BC (1 $\Sigma$  interval of 3070-2920 BC) [Szmyt 1999a]. Because the fragment of painted pottery was found in the deposits covering the feature, the dating cannot be directly applied to it. On account of the homogenous character of the filling material, it may be accepted that the grave was filled relatively quickly. It means that the dating corresponds to the chronology of the discussed fragment or sets *terminus ante quem* for it. Admittedly, in the zone of the site close to feature A136, no signs of older GAC settlement were found, but such signs were actually found approx. 200 m west of it (feature C2). They are also associated with phase IIb, but with its older segment occurring ca 3230 BC (1 $\Sigma$  interval of 3300-3110 BC). This result was obtained by calibrating four radiocarbon datings from feature C2 [Szmyt 1999a]. In sum, the most probable chronology of the analyzed fragment fits into the period of 3230-3030 BC.

**Piecki 8.** The bones of a deceased person, placed on the bottom of a grave (feature 18) were dated producing a date of ca 2594 $\pm$ 198 BC (2700-2490 BC; Table 1). At the site, however, older settlement was recorded belonging to phase IIIa as well [Szmyt 1998]. Some light is shed on its chronology by the concurrent datings of two settlement pits (of features 13 and 16) whose joint calibration marks out the time of ca 2886 BC (1 $\Sigma$  interval of 2890-2760 BC). The fragment of a painted vessel was recorded in the deposits covering the grave. Hence, it is most probable that the date from the grave is *terminus ante quem* for the fragment, whereas the dates from settlement features are its *terminus post quem*. In other words, the chronology of the fragment lies within the interval of max. 2890-2490 BC (minimum interval: 2760-2700 BC).

**Żegotki 2.** In the “cultural layer”, in excavation B1a, there occurred materials displaying features associated with phases IIb and IIIa of the GAC [Szmyt 1999a]. <sup>14</sup>C dates are available only for two features associated with the same phase, namely IIIa, but with settlement dating to two different periods: the older one occurring ca 2740 $\pm$ 101 BC and the younger one dated to 2539 $\pm$ 81 BC (Table 1). Consequently, the two dates set *terminus ad quem* for the fragments of painted pottery presented here, i.e. the chronology of the fragments should fall on the younger of the named intervals at the latest.

To sum up all the recounted investigations, it can be said that the hitherto recorded manifestations of the use of dyes in the manufacture of GAC ceramics are related to phases IIb and IIIa, while its absolute chronology covers the period of max. 3230 (Kuczkowo 1) - 2460 (Żegotki 2) BC. A more credible, however, seems to be the interval of 3030-2460 BC. When considered separately, the chronologies

of the use of organic and mineral dyes differ considerably. The former have been identified so far only in phase IIb materials (Kuczkowo 1, Bożejewice 22), while the latter have been recorded in pottery assemblages from phases IIb and IIIa (Bożejewice 22, Piecki 8, Żegotki 2). The absolute chronology may be thus fixed at 3030- 2900 BC (organic dyes) and 2900-2460 BC (mineral dyes).

## CONCLUSION

The origins of the ornamentation type of GAC pottery discussed here may be sought only in the TC circle. The chronological findings presented above allow us to synchronize the manifestations of the use of dyes among the societies of the Kujawy GAC with phase CII of the TC [see papers by Videiko, Radiocarbon. . . , Koško, Klochko, Szmyt, A Comparative. . . , in this volume]. Further studies should focus on tracing the transmission routes and mechanisms of this unique technology from Pontic to Baltic communities. At present, the most plausible hypothesis seems to be the one about the transmission through the mediation of Volhynia GAC societies [Szmyt 1996; 1999b]. It must be noted, however, that the chronology of the oldest manifestations of the use of the pottery painting technique in the Kujawy GAC, set above at ca 3030 BC at the latest, precedes the oldest datings for Volhynia GAC structures [Kadrow, Szmyt 1996; Szmyt 1999b]. Furthermore, in the materials of the eastern group of the GAC no traces of dyes have been found. Therefore, it is not entirely impossible that the transmission of the discussed skills involved Kujawy FBC societies among whom the use of dyes (primarily organic ones) reaches back to ca 3600 BC [Langer, Koško 1992]. What is more, as it follows from the data cited in part 2, the traces of the use of organic dyes are on the whole older (associated exclusively with phase IIb and dated to ca 3030-2900 BC), whereas those of mineral dyes are younger (are associated with phases IIb and IIIa and can be dated to 2900-2460 BC). The question, however, calls for more studies.

\* \* \*

The experience so far has indicated that the technologies of spreading dyes on pottery, originating with the TC, were adopted chiefly by FBC societies. [Langer, Koško 1992]. The findings discussed here argue in favor of a wider reception of these technologies than it was thought before. The circle of reception is made still wider by the information about the use of (mineral?) dyes by Old Upland (Małopolska) groups of the CWC (Żerniki Górne, grave 140 and Smroków) [Włodarczak 1998].

*Translated by Piotr T. Żebrowski*

## ABBREVIATIONS

AO	– Arkheologicheskiye otkrytya, Moskva.
AJA	– American Journal of Archaeology, New York.
BPS	– Baltic-Pontic Studies, Poznań.
EA	– Eurasia Antiqua, Berlin.
FPP	– Folia Praehistorica Posnaniensia, Poznań.
KSIA	– Kratkiye soobshcheniya Instituta Arkheologii, Moskva.
KSIA AN USSR	– Kratkiye soobshcheniya Instituta Arkheologii AN USSR, Kiev.
KSIIIMK	– Kratkiye soobshcheniya Instituta Istorii Materialnoy kultury, Moskva.
KSOGAM	– Kratkie Soobshcheniya Odesskogo Gosudarstvennogo Arkheologicheskogo Muzeya, Odessa.
MIA	– Materialy i issledovaniya po arkheologii, Moskva.
NA IA NANU	– Naukovy Arkhiv Instituta Arkheologii Nacionalnoi Akademii Nauk Ukrainu, Kiev.
SA	– Sovetskaya Arkheologia, Moskva.
SpA	– Sprawozdania Archeologiczne, Kraków.
ZFA	– Zeitschrift für Archäologie, Berlin.

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