

THE CHRONOLOGY OF THE SUBOTIV SETTLEMENT

VICTOR I. KLOCHKO,¹ NIKOLAI N. KOVALIUKH,² VADIM V. SKRIPKIN² and
INGO MOTZENBECKER³

ABSTRACT. Samples collected at the Chornoliska culture site near the village of Subotiv, Cherkasy region during the 1994–1995 Ukrainian-German expedition were radiocarbon dated in Kiev. The foundation of the Subotiv settlement dates to 1300–1200 cal BC. A skeleton found in one of the buildings at this site is dated at the end of the early period (between 1120 and 1040 cal BC). In the youngest part (a small town) of the Subotiv settlement, we found the remains of a “building sacrifice”—the skeleton of a teenager. The average calibrated date for this skeleton is 834–807 cal BC, whereas the timber from the rampart dates between 902–810 cal BC. Thus, the rampart was apparently built between 834–807 cal BC. Among the objects found on the site were Arzhan-type bone arrowheads. Such arrowheads, when found in Eastern Europe, are believed to indicate the military expansion of Proto-Scythian nomads. The Sargary settlement in western Kazakhstan dates to 960–820 cal BC, the Arzhan arrow in Siberia to 960–850 cal BC. We assume that the Chornogorivka complexes in eastern Eurasia date to the earlier time period (960–820) than those in western Eurasia (834–807). The time of the Chornogorivka expansion on the territory of Ukraine is therefore within the range 834 to 820 BC.

INTRODUCTION

The Chornoliska culture, discovered by Ukrainian archaeologist A. I. Terenoghkin in the 1950s–1960s (Terenoghkin 1961), was spread over a vast geographical area. The area included the forest-steppe zone between the Dniester and Dnieper Rivers, and the Vorskla River basin (a tributary of the Dnieper River). This culture is contemporaneous with the monuments of the Ha A-B periods in Central Europe, the Tracian Halstatt cultures, the Luzitanian culture in Poland, and, partially, the Cimmerian period of the northern Black Sea area; this culture directly precedes the Scythians. The culture comprises two periods dated by traditional archaeological methods: the early period (Xth–IXth centuries BC) and the later period (VIIIth century to the first half of the VIIth century BC) (Terenoghkin 1971).

The artifacts of the Chornoliska culture are closer in general appearance to those of Urnenfeld and Trakia Halstatt cultures than to monuments of Eastern cultures (Sroubnaia and Andronovskaia). By now *ca.* 100 settlements of this culture are known, but detailed excavations were conducted only on selected sites and, in addition, covered a very small area. The most thoroughly excavated Chornoliska culture sites are located at the Tiasmyn River basin. The best-studied site is Subotiv, located in the Lower Tiasmyn area near the village of Subotiv, Cherkasy region, Ukraine. Terenoghkin excavated this site many years ago, but the work was not finished and the materials were unpublished. Some excavated materials are shown in Figures 1 and 2.

The goals of the recent joint Ukrainian-German research at Subotiv were to complete excavations on the site, investigate the stratigraphy, and collect materials for metallurgical analysis and radiocarbon dating. ¹⁴C dating of this site is of great importance for both the Chornoliska culture and for determining the exact dates of the end of this culture and the appearance of the Chornogorivka-type sites—the first wave of the Eastern Proto-Scythian nomads in the northern Black Sea area. This will allow us to determine the beginning of ethnic and cultural processes resulting in formation of the Scythian culture in Eastern Europe.

¹Institute of Archaeology of the National Academy of Sciences of Ukraine, 12 Heroyev Stalingrada Ave., Kiev 254655 Ukraine

²State Scientific Center of Environmental Radiogeochemistry of the National Academy of Sciences of Ukraine, 34 Palladin Ave., Kiev 142, 252680 Ukraine

³Deutsches Archäologisches Institut, Eurazien Abteilung, Postfach 330014, D-14191 Berlin, Germany

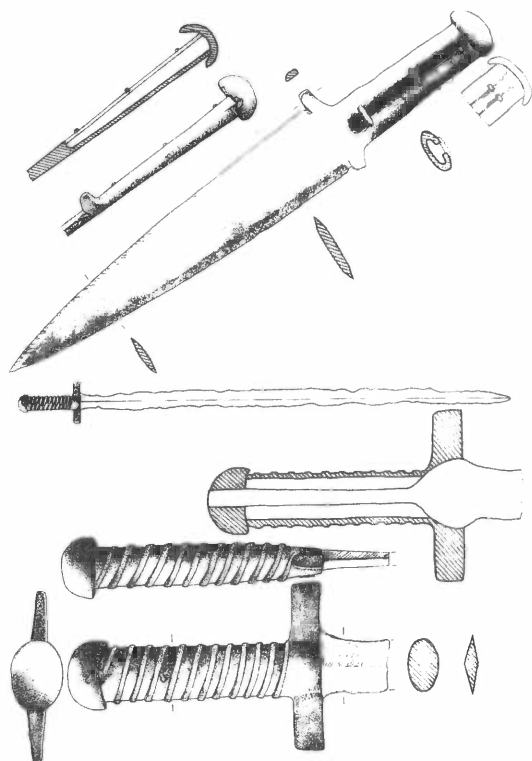


Fig. 1. Materials excavated at the Subotiv site: A) bronze dagger ("karasuk" type). B) iron sword with bronze hilt.

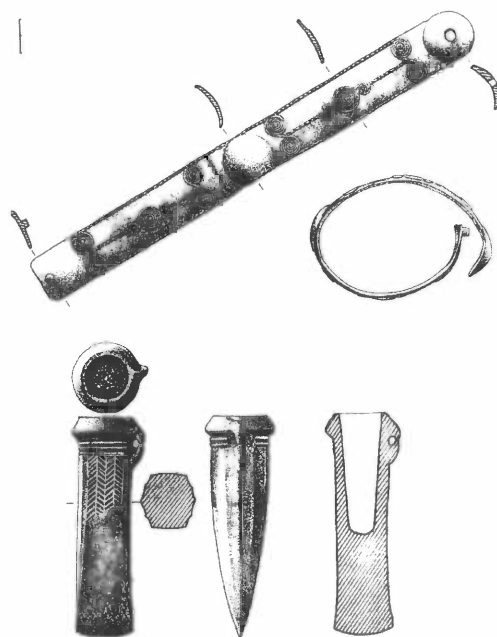


Fig. 2. Bronze bracelet and bush ax found in 1955 at Subotiv site

METHODS

The Kiev laboratory has developed a new method for lithium carbide production from organic materials. This technique allows us to obtain lithium carbide from bone collagen without preliminary extraction of the collagen. The bones are divided into small parts and after washing thoroughly with trisodiumphosphate solution, and are treated with 2% hydrofluoric acid. This acid decomposes carbonates but fixes calcium. It gives the sample a porous and solid structure, which allows easy washing and cleaning. The sample treated in this way is mixed with manganese dioxide and placed into the reactor for vacuum thermodestruction. The lithium carbide yield is *ca.* 95%. This method performs well, especially for small samples (Skripkin and Kovalyukh 1998). The samples were measured with a Quantulus™ 1220 liquid scintillation counter (LSC), using 7.3 and 0.8-mL Teflon® vials and 4 g L⁻¹ PPO plus 0.1 g L⁻¹ POPOP.

RESULTS

Chronology of the Subotiv Site

The main aim of the joint Ukrainian-German research at the Subotiv site was to obtain a series of ¹⁴C dates. The dating material consisted mainly of animal and human bones, taken from carefully stratified layers representing all periods of the settlement (Fig. 3).

Table 1 shows the ¹⁴C dates. The results were calibrated using the Groningen Radiocarbon Calibration Program (van der Plicht 1993), employing the dataset from Stuiver and Pearson (1986), and

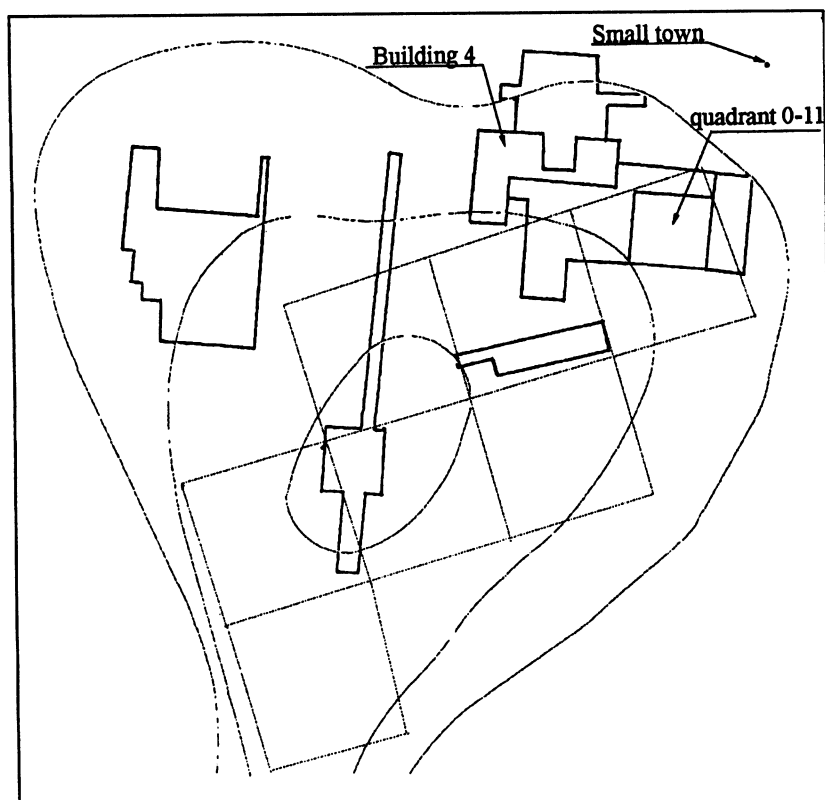


Fig. 3. Map showing the excavations at the Subotiv site

Pearson and Stuiver (1986). The earliest dates were obtained for the bottom of Building no. 4 (Ki-5505, 5502 and 5504). The average result for these 3 dates is 3055 ± 35 BP. The calibrated result (2σ) is 1404–1254 and 1244–1210 cal BC. Taking into account the archaeological and historical information available for the Chornoliska culture, the preferable interval for the construction of Building no. 4 is 1244–1210 cal BC.

The period when the building ceased to be used as a living quarters is estimated from the dating of a human skeleton buried inside: *i.e.*, 1125–1028 cal BC (average date). Thus, the first horizon of the settlement is traced to the time range (1244–210)–(1125–1028) cal BC. The life activity at the “quadrant 0–11” excavation site is dated between 1218 and 1006 (Ki-5863), and 1032 and 900 (Ki-5864) cal BC. The youngest object of the site is the small town’s rampart, built on the cultural layer of the Chornoliska period. Under the rampart, human remains from a “building sacrifice” were found. Table 2 shows the dates of the skeleton and the timber from the rampart.

As seen from Table 2, the rampart was constructed no later than 815–804 cal BC (1σ) or 825–801 cal BC (2σ). We believe that this date marks end of human occupation of the site. Hence, the second Chornoliska culture period of the Subotiv site can be dated to 1000–800 cal BC. The samples from the excavations of the small town were ^{14}C dated using different fragments of the skeleton. The fragments were subjected to independent physical-chemical treatments followed by an independent measurement of the ^{14}C content in each one. We obtained a series of ^{14}C dates with an average statistical error of 19 yr. This allows minimization of the age uncertainty after calibration (Table 2). The age of some skeleton fragments differ from the average date, but within statistical scatter.

TABLE 1. Radiocarbon Dating of the Samples from the Subotiv Site

No.	Sample location	Sample material	Lab no. (Ki-)	¹⁴ C age	
				BP	cal BC
1	Building no. 4	Bones	5507	2910 ± 55	1σ 1198–1186 1164–1143 1132–1002 2σ 1260–1234 1220–930
2	Debris from building no. 4	Bones	5506	2940 ± 50	1σ 1250–1248 1206–1174 1170–1046 2σ 1304–1286 1268–994
3	Debris from building no.4	Bones	5501	2950 ± 45	1σ 1256–1240 1212–1113 1096–1064 2σ 1296–1290 1266–1006
4	Debris from building no. 4	Bones	5508	3010 ± 50	1σ 1366–1360 1312–1164 1144–1130 2σ 1396–1114 1094–1070
5	Debris from building no.4	Bones	5503	2980 ± 60	1σ 1306–1284 1268–1115 1090–1076 2σ 1386–1342 1320–1014
6	Hole no. 1, building no. 4	Coal	5504	3030 ± 60	1σ 1386–1342 1322–1202 1182–1166 1140–1134 2σ 1414–1114 1096–1070
7	Bottom, building no. 4	Coal	5502	3040 ± 50	1σ 1388–1340 1324–1254 1242–1210 2σ 1406–1158 1148–1126
8	Bottom, building no. 4	Coal	5505	3100 ± 40	1σ 1410–1366 1358–1312 2σ 1430–1262
9	Quadrant 0–11, sample no. 4/1	Bones	5863	2935 ± 40	1σ 1202–1184 1166–1141 1134–1044 2σ 1260–1236 1218–1006
10	Quadrant 0–11, sample no. 3/1	Bones	5859	2930 ± 40	1σ 1198–1186 1166–1142 1132–1036 2σ 1258–1236 1216–1004

TABLE 1. Radiocarbon Dating of the Samples from the Subotiv Site (*Continued*)

No.	Sample location	Sample material	Lab no. (Ki-)	¹⁴ C age	
				BP	cal BC
11	Quadrant 0-11 Northwestern square, eastern wall Sample no. 3/2	Coal	5858	2910 ± 35	1σ 1124-1020
					2σ 1252-1246 1206-994
12	Quadrant 0-11 Sample no. 4/2	Bones	5862	2890 ± 30	1σ 1115-1092 1074-1006
					2σ 1160-1147 1128-986 960-938
13	Quadrant 0-11 Sample no. 4/1A	Bones	5869	2860 ± 30	1σ 1044-982 966-932
					2σ 1116-1090 1078-924
14	Quadrant 0-11 Southeastern square Sample no. 4/3	Bones	5861	2875 ± 40	1σ 1116-1090 1078-990 954-942
					2σ 1160-1146 1128-918
15	Quadrant 0-11 Southeastern square Sample no. 4/3A	Bones	5867	2875 ± 40	1σ 1116-1090 1078-990 954-942
					2σ 1160-1146 1128-918
16	Quadrant 0-11 Sample no. 3/1A	Bones	5865	2850 ± 35	1σ 1030-974 972-930
					2σ 1116-1090 1078-912
17	Quadrant 0-11 Southwestern square Sample no. 7	Bones	5860	2845 ± 35	1σ 1020-928 2σ 1115-1092 1076-908
18	Quadrant 0-11 Sample no. 3/1H	Bones	5866	2870 ± 50	1σ 1116-1090 1080-984 962-934
					2σ 1202-1182 1168-1140 1136-906
19	Quadrant 0-11 Northwestern square, eastern wall Sample no. 3/2/A	Bones	5864	2820 ± 30	1σ 992-950 948-922
					2σ 1032-900
20	Quadrant 0-11 Sample no. 4/2A	Bones	5868	2830 ± 40	1σ 1008-916 2σ 1115-1092 1076-898 874-852
21	Small town timber from the rampart (average date)	Timber	5368-5370	2708 ± 35	1σ 898-876 850-814
					2σ 906-808
22	Small town. Human skeleton from under the rampart (average date)	Bones	5359-5367	2680 ± 17	1σ 824-810 2σ 834-807
23	Settlement of Sargary	Timber	Le-1183	2700 ± 60	1σ 900-868 860-808
					2σ 986-960 938-792

TABLE 2. Dating Results for Skeleton Fragments Found Under the Rampart of Subotiv Village, Cherkasy Region

Sample no.	Lab no. (Ki-)	¹⁴ C age (yr BP)	Calibrated age (BC)	Sample no.	Lab no. (Ki-)	¹⁴ C age (yr BP)	Calibrated age (BC)
1	5359	2610 ± 40	1σ 812–776 2σ 836–760 674–664 630–592 580–544	6	5364	2710 ± 45	1σ 900–872 854–812 2σ 922–802
2	5360	2640 ± 35	1σ 820–796 2σ 842–776	7	5365	2600 ± 40	1σ 810–770 2σ 828–760 678–658 634–550
3	5361	2700 ± 40	1σ 896–876 850–808 2σ 908–804	8	5366	2680 ± 35	1σ 842–802 2σ 900–866 860–800
4	5362	2730 ± 40	1σ 900–830 2σ 930–806	9	5367	2655 ± 30	1σ 822–802 2σ 844–732
5	5363	2590 ± 45	1σ 814–762 626–598 568–566 2σ 824–756 686–540	Average date		2657 ± 19	1σ 815–804 2σ 825–801

DISCUSSION AND CONCLUSION

Among the Eurasian monuments contemporaneous with the second Chornoliska culture horizon of the Subotiv site dated by the ¹⁴C method, the Tuva Arzhan burial mound is of particular interest. The bone arrowheads from this burial mound are similar to the rhomboidal arrows of the Subotiv site. We relate the appearance of those arrows in Subotiv with the termination of human activities at the site. The latest ¹⁴C date of the burial mound is 810 cal BC (Marsadolov *et al.* 1996; Zaitseva *et al.* 1996). By correlating the dendrochronological and ¹⁴C dates of the burial mound, we obtained a date of 800 BC (Zaitseva *et al.* 1996). ¹⁴C dates of the Arzhan site are contemporaneous with the those of the termination of the Subotiv site. The ¹⁴C date for Building 5 (mud-hut) in the Sargary settlement in Western Kazakhstan, where arrowheads of the Arzhan type were found, yields 2700 ± 60 BP (Le-1183). The calibrated date is 938–792 cal BC (Avanesova 1991). Both archaeological materials (arrows of the Arzhan type) and ¹⁴C dates allow us to view these three monuments within the framework of one historic hypothesis concerning the Western expansion of “proto-Scythians” (Klochko and Murzin 1987a,b, 1989). Chochorowski proposed to date this event—which he called a “Cimmerian expansion to the territory of Central Europe”—between 950 and 880 BC (Chochorowski 1995). In terms of our recent dates, we believe that this expansion of Eastern nomads—which caused the emergence of the Chornogorivka culture in the Ukraine territory (Dubovskaya 1993)—occurred no later than 820–800 BC.

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