

LATE PALEOLITHIC CHRONOLOGY OF THE EAST EUROPEAN PLAIN

YU. S. SVEZHENTSEV and S. G. POPOV

St. Petersburg Branch of the Institute of Archaeology, Russian Academy of Sciences
St. Petersburg 192041 Russia

ABSTRACT. We report 172 dates on osseous material from Paleolithic sites of the East European Plain.

INTRODUCTION

A fundamental problem of prehistoric archaeology is the construction of an absolute chronology of late Paleolithic occupation on the East European Plain. We established the chronology of Paleolithic cultures using radiocarbon dating techniques and stratigraphic correlation. Unfortunately, few late Paleolithic occupation sites from well-preserved cultural layers bear distinct cultural stratigraphies. Geological stratigraphy, on the other hand, is based on reliable dating methods. For relative dating of a Late Paleolithic artifact, for example, by flint typology, the presence or absence of tool types or changes in lithic technology may be used only if the complexes being compared are located near each other and belong to the same culture.

We employed the ^{14}C dating method to resolve questions regarding Late Paleolithic chronology. However, the potential of the technique for dating Paleolithic artifacts is somewhat limited: environmental conditions at the time of deposition and the fairly long interval (10–40 ka) between deposition and excavation often result in the loss of carbon-containing substances (e.g., wood, charcoal, peat) in cultural layers. Bone and burned bone, teeth and tusks are the most common, frequently the only organic material found in Late Paleolithic sites in the central part of the Russian Plain. Because fossil bone may permit direct dating of human and animal remains, it is necessary to determine if reliable results are achieved by ^{14}C -dating fossil bone. Due to its large surface area (up to $200\text{ cm}^2\text{ g}^{-1}$), bone has a high capacity for absorbing materials that decrease its ^{14}C age.

Principal problems involved in ^{14}C -dating Late Paleolithic bone material pertain to the difficulty of extracting “pure” collagen in sample pretreatment, and to the possibility of bone contamination by younger carbon. Purification of collagen consists of the removal of humic substances and inorganic carbonates. Extraction of pure collagen is difficult because of its molecular instability; its treatment with weak alkali and acid solutions does not remove contaminants, while a more thorough treatment causes sample disintegration and loss. Therefore, the procedure is performed using rigidly defined controls on, for example, the extent of fragmentation, acid and alkali concentration, treatment period, temperature and pH during extraction. The hypothesis that burned bone may be regarded as a more reliable material for dating than unburned bone requires further experimental evidence; it appears that burned bone dates tend to be older than unburned bones.

This date list reports 172 ^{14}C dates (Tables 1–5) from different laboratories, 70 of which were obtained at the Radiocarbon Laboratory, St. Petersburg Branch of the Institute of Archaeology, using osseous material (bone and burned bone, teeth, tusk plates) from Paleolithic sites of the East European Plain. The large number of dates on reference sites and strata, tool typology and palynological and paleogeographical evidence may serve as the basis for constructing a valid Paleolithic chronology. Many of the dates reported here have been previously published (Svezhentsev 1993).

TABLE 1. ^{14}C Dates of Paleolithic Material From the East European Plain: Central/Middle Russian Highland

Sample no.	Lab no.	Sample context, material	^{14}C age
<i>Kostenki I. Upper Cultural Layer</i>			
1	GIN-1870	Burned bone	22,300 $\pm$ 230
2	GIN-2534	Burned bone	21,300 $\pm$ 400
3	GIN-2533	Dugout A, burned bone	22,300 $\pm$ 200
4	GIN-2530	Dugout Th, burned bone	22,800 $\pm$ 200
5	GIN-2528	Dugout Th, burned bone	23,000 $\pm$ 500
6	GIN-2527	Dugout A, burned bone	23,500 $\pm$ 200
7	GIN-2529	Dugout 3	24,100 $\pm$ 500
8	LE-2800	Square Th-70, mammoth tooth N154	22,760 $\pm$ 250
9	LE-2801	Dugout N 153	21,800 $\pm$ 200
10	LE-2949	Mammoth tooth N 159	19,860 $\pm$ 200
11	LE-2950	Pit N 150, mammoth tooth	19,010 $\pm$ 120
12	LE-2951	Dugout, square F-72-73, mammoth tooth	23,770 $\pm$ 200
13	LE-2969	Mammoth tooth N 151	22,700 $\pm$ 250
14	LE-3276	L-78, mammoth tooth	23,010 $\pm$ 300
15	LE-3279	L-77, mammoth tooth	21,680 $\pm$ 700
16	LE-3282	Pit, Square 78, mammoth tooth	22,020 $\pm$ 310
17	LE-3289	Dugout TUFH-72-75, mammoth tooth	23,260 $\pm$ 680
18	LE-3286	Dugout TUFH-72-75, burned bone	23,490 $\pm$ 420
19	LE-3277	K-I-88, burned bone	20,100 $\pm$ 680
20	LE-3280	Porous burned bone	18,230 $\pm$ 620
21	LE-3281	O-78, burned bone, small fraction	19,620 $\pm$ 460
22	LE-3283	Pit K-78	23,640 $\pm$ 320
23	LE-3290	P-76, carbonated bone	22,060 $\pm$ 500
24	LE-3292	H-76, pit, burned bone	19,540 $\pm$ 580
25	LE-2030	Kostenki I, Layer IV, mammoth tooth	27,390 $\pm$ 300
26	LE-3541	Kostenki I, III; Layer III, charcoal	25,730 $\pm$ 1800
27	LE-3542	Kostenki I, Layer V, charcoal	30,170 $\pm$ 570
28	LE-1599	Kostenki II, Cave K-2, bone	16,190 $\pm$ 150
29	GrN-10509	Kostenki VIII, Layer II, charcoal	27,700 $\pm$ 750
<i>Kostenki XI</i>			
30	LE-1403	Layer Ia, bone	12,000 $\pm$ 100
31	LE-1637	Layer Ia, bone	14,610 $\pm$ 120
32	LE-1704a	Layer Ia, bone	16,040 $\pm$ 120
33	LE-1704b	Layer Ia, bone	17,310 $\pm$ 200
34	GIN-2532	Layer Ia, bone	19,900 $\pm$ 350
35	GIN-2531	Layer II, bone	21,800 $\pm$ 200
36	TA-34	Layer II, bone	15,200 $\pm$ 300
37	LE-1638	Layer III, bone	22,760 $\pm$ 340
<i>Kostenki XII</i>			
38	TA-154	Depth 2.0–2.5 m, bone	20,900 $\pm$ 390
39	GIN-89	Layer II, depth 1.7 m, bone	23,060 $\pm$ 300
40	GrN-7758	Layer Ia, charcoal	32,700 $\pm$ 700

TABLE 1. (Continued)

Sample no.	Lab no.	Sample context, material	¹⁴ C age
41	LE-1428a	Layer Ia, charcoal, bone	28,700 ± 400
42	LE-1428	Layer Ia, charcoal, bone	30,240 ± 400
43	LE-1428	Mammoth tooth	31,150 ± 150
44	LE-1428	Mammoth tooth	31,900 ± 200
45	LE-1400	Kostenki XIV, layer II, bone	25,090 ± 310
46	LU-59a	Kostenki XIV, layer II, bone	26,400 ± 660
47	LU-59b	Kostenki XIV, layer II, bone	28,200 ± 700
48	LE-1431	Kostenki XVI, upper layer, bone	25,100 ± 150
49	GrN-10511	Kostenki XVII, layer I, charcoal	26,750 ± 700
50	GrN-10512	Kostenki XVII, layer II, charcoal	32,200 ± 2000
51	LE-1436	Kostenki XVII, lower layer, bone	32,780 ± 300
52	GrN-12596	Kostenki XVII, lower layer, charcoal	36,400 ± 1700
53	LE-1705a	Kostenki XIX, bone	17,420 ± 150
54	LE-1705	Kostenki XIX, bone	18,900 ± 300
55	LE-1437a	Kostenki XXI, lower layer III, bone	19,100 ± 150
56	LE-1437	Kostenki XXI, lower layer III, bone	20,250 ± 100
57	LE-1437	Kostenki XXI, lower layer III, bone	22,900 ± 150
58	GrN-7363	Charcoal	22,270 ± 150
59	GrN-10513	Charcoal	21,620 ± 340
60	Tal-	Burned loamy soil	26,765 ± 2000
<i>Avdeevo</i>			
61	GIN-1571	Hearth 2, monolithic burned bone	22,700 ± 700
62	GIN-1571	Extract from burned bone before HC decay	17,200 ± 1800
63	GIN-1570	Extract from part 0.5–5 mm	19,800 ± 1200
64	GIN-1569	Extract from part <0.5 mm	21,200 ± 200
65	GIN-1969	Hearth 6, monolithic burned bone	22,400 ± 600
66	GIN-1747	Hearth 6, monolithic burned bone	20,800 ± 200
67	GIN-1746	Hearth 6, monolithic burned bone	20,100 ± 500
68	GIN-1970	Monolithic burned bone	22,200 ± 700
69	GIN-1748	Hearth 3, monolithic burned bone	21,000 ± 200
70	QC-886	Bone from 1948 excavation	16,565 ± 270
71	QC-621	Bone from 1978 excavation	16,960 ± 420
72	GIN-88	Upper layer I, vegetable remains	12,300 ± 100
73	LU-742	Upper layer I, charcoal	13,210 ± 270
74	MO-636	Upper layer I, charcoal	11,760 ± 240
<i>Gagarino, Lipeckan Region</i>			
75	LE-1432a	Mammoth tooth	17,930 ± 100
76	LE-1432	Mammoth tooth	20,150 ± 300
77	LE-1432	Mammoth tooth	20,820 ± 300
78	GIN-1872	Burned bone	21,800 ± 300
79	IGAN-83	Mammoth tooth from depth 1.3 m	30,000 ± 1900
<i>Sungir, Vladimirnian Region</i>			
80	GrN-5446	Charcoal	24,430 ± 400
81	GrN-5425	Charcoal	25,500 ± 200

TABLE 1. (Continued)

Sample no.	Lab no.	Sample context, material	¹⁴ C age
82	GIN-326a	Charcoal	21,800 ± 1000
83	GIN-326	Charcoal	22,500 ± 600

TABLE 2. ¹⁴C Dates of Paleolithic Material From the East European Plain: Drainage Basin of the Dnieper River

Sample no.	Lab no.	Sample context, material	¹⁴ C age
<i>Yudinovo, Northern Bank of the Sudost River</i>			
84	LU-127	Mammoth tooth	15,660 ± 180
85	LU-103	Burned bone	13,830 ± 850
86	LU-153	Bone	13,650 ± 200
87	OxA-695	Burned bone	13,300 ± 200
88	OxA-696	Burned bone	12,300 ± 200
89	LE-3301	Yudinovo 88, dugout II, bone	15,790 ± 320
90	LE-3302	Yudinovo D-60, 59, dugout II, burned bone	17,800 ± 810
91	LE-3401	Yudinovo E-53-54, dugout I, burned bone	18,630 ± 320
92	LE-3303	Yudinovo, upper layer, bone carbonate	13,720 ± 210
<i>Eliseevichi, Northern Bank of the Sudost River</i>			
93	LU-360	Mammoth tooth from depth 1.2–1.3 m	17,340 ± 170
94	LU-126	Mammoth tooth	14,470 ± 100
95	LU-102	Burned bone	12,970 ± 140
96	QC-889	Bone	15,600 ± 1350
<i>Mezhirichi, Ukraine</i>			
97	QC-900	Dwelling, mammoth tooth	15,245 ± 1080
98	QC-897	Dwelling, mammoth tooth	14,320 ± 270
99	OxA-709	Dwelling I, mammoth tooth	12,900 ± 200
100	OxA-712	Dwelling II, mammoth tooth	14,400 ± 250
<i>Kamennaya Balka Ii, Mertvii Donets River</i>			
101	OxA-699	Depth 1.0 m below surface, amino acids	10,900 ± 400
102	OxA-778	Depth 1.0 m, carbonaceous residue of partly burned bone	13,600 ± 180
103	GIN-3472	Depth 1.0 m below surface, bone	15,350 ± 550
104	GIN-2773	Korolevo I, Layer I, burned bone	25,700 ± 400
105	GIN-2773	Korolevo II, Layer II, burned bone	38,500 ± 1000
106	LU-359	Hotilevo II, northern bank of the Desna River, depth 4.0–4.1 m	23,660 ± 270
107	UGAN-73	Hotilevo II, northern bank of the Desna River, depth 4.0–4.1 m	24,960 ± 400
108	UGAN-82	Timonovka I, Bryanskaya region, mammoth tooth	12,200 ± 300
109	GIN-2002	Timonovka I, Bryanskaya region, mammoth tooth	16,300 ± 700
110	LU-358	Timonovka II, bone	15,110 ± 530
111	QC-899	Pyshkari, near Novgorod-Severskii	16,775 ± 605

TABLE 2. (Continued)

Sample no.	Lab no.	Sample context, material	^{14}C age
112	OxA-698	Novgorod-Severskii, mammoth tooth	19,800 $\pm$ 350
113	OxA-697	Radomyshl, depth 0.6–0.8 m	19,000 $\pm$ 300
114	OxA-700	Dobranichevka, Loess III, mammoth tooth	12,700 $\pm$ 200
115	OxA-715	Chulatovo, Desna River, mammoth tooth	14,700 $\pm$ 250
116	OxA-718	Kirillovskaya, mammoth tooth, depth 13–22 m	19,200 $\pm$ 250
117	OxA-719	Mezin, Chernigov, northern bank of the Desna River; mammoth tooth	15,100 $\pm$ 200
118	LU-361	Pogon, Byelorussia, bone	18,690 $\pm$ 770
119	LU-104	Berdyzh, Byelorussia, mammoth tooth	23,430 $\pm$ 180
120	OxA-716	Berdyzh, Byelorussia, mammoth tooth	15,100 $\pm$ 250
121	LU-125	Yuroviechi, Byelorussia, bone	26,470 $\pm$ 420
122	QC-898	Gontsy, near Chernigov, burned bone	13,400 $\pm$ 180
123	OxA-717	Second terrace, mammoth tooth	14,600 $\pm$ 200

TABLE 3. ^{14}C Dates of Paleolithic Material from the East European Plain: The Carpathians, Moldavia and the Drainage Basin of the Dniester River

Sample no.	Lab no.	Sample context, material	^{14}C age
<i>Molodova-5</i>			
124	GIN-7	Layer Ia	10,590 $\pm$ 230
125	GIN-56	Layer II, loamy soil	12,300 $\pm$ 140
126	GIN-8	Layer II, loamy soil	11,900 $\pm$ 230
127	GIN-9	Layer III, charcoal	13,370 $\pm$ 540
128	GIN-147	Layer IV, charcoal	17,100 $\pm$ 1400
129	GIN-52	Layer V, charcoal	17,100 $\pm$ 180
130	GIN-105	Layer VI, charcoal	16,750 $\pm$ 250
131	MO-11	Layer VII, charcoal	23,000 $\pm$ 800
132	GIN-10	Layer VII, fossil soil	23,700 $\pm$ 320
133	LU-14	Layer VIII, charcoal	>24,600
134	LU-15a	Layer IX, charcoal	29,650 $\pm$ 1320
135	LU-15	Layer IX, charcoal	28,100 $\pm$ 1000
136	GIN-106	Layer X, fossil soil	23,100 $\pm$ 400
137	LU-17	Layer XI	>45,600
<i>Kosautsy</i>			
138	GIN-4148	Layer I, charcoal	17,200 $\pm$ 500
139	LE-3304	Layer II, dugout I, charcoal	16,860 $\pm$ 770
140	SOAN-2461	Layer II, charcoal	16,940 $\pm$ 1200
141	SOAN-2462	Layer II, charcoal	19,020 $\pm$ 925
142	LE-3305	Layer II, charcoal	15,520 $\pm$ 800
143	LE-3306	Layer 3, charcoal	17,400 $\pm$ 340
144	GIN-4149	Layer 3, charcoal	16,160 $\pm$ 250
145	SOAN	Layer 3, charcoal	17,840 $\pm$ 550
146	LE-3307	Layer 3, charcoal	17,390 $\pm$ 580

TABLE 3. (Continued)

Sample no.	Lab no.	Sample context, material	^{14}C age
147	LE-3308	Layer 4, charcoal	17,640 $\pm$ 830
148	GIN-4150	Layer 4, charcoal	17,100 $\pm$ 250
149	GIN-4152	Layer 5, charcoal	17,030 $\pm$ 180
150	GIN-832	Korman IV, near Chernigov, fossil soil	27,500 $\pm$ 100
151	GIN-1099	Korman IV, layer VII, charcoal	24,500 $\pm$ 500

TABLE 4. ^{14}C Dates of Palaeolithic Material from the East European Plain: Steppe Zone

Sample no.	Lab no.	Sample context, material	^{14}C age
152	LE-1637	Amvrosievka, Miysskui Bay, Ukraine, collected 1950, bone	15,250 $\pm$ 150
153	LE-1805	Amvrosievka, Miysskui Bay, Ukraine, collected 1950, bone	20,620 $\pm$ 150
154	LE-3403	Amvrosievka, 88, central dugout II, bone	21,500 $\pm$ 340
155	GIN-1938	Zolotovka I, lower Don River, bone	17,400 $\pm$ 150
156	LE-1601	Myralovka, Miysskui Bay, bone	19,630 $\pm$ 200
157	LE-1438	Myralovka, Miysskui Bay, bone	18,780 $\pm$ 300
158	LE-2947	Anetovka II, right bank of the Bakchala River	19,170 $\pm$ 120
159	LE-2424	Anetovka II, burned bone, right bank of the Bakchala River	18,040 $\pm$ 150
160	LE-4066	Anetovka II, burned bone, right bank of the Bakchala River	18,265 $\pm$ 1650
161	LE-4610	Anetovka II, burned bone, right bank of the Bakchala River	19,090 $\pm$ 980
162	LE-2624	Anetovka II, mammoth tooth	24,600 $\pm$ 150
163	LE-1602a	Sagaidak I, first terrace of the South Bug River, mammoth tooth	21,240 $\pm$ 200
164	LE-1602	Sagaidak I, first terrace of the South Bug River, mammoth tooth	20,300 $\pm$ 200
165	LE-2946	Leski, South Bug River, mammoth tooth	19,200 $\pm$ 200
166	LE-4456	Leski, South Bug River, mammoth tooth	23,770 $\pm$ 1540

TABLE 5. ^{14}C Dates of Palaeolithic Material from the East European Plain: Northeast

Sample no.	Lab no.	Sample context, material	^{14}C age
167	TA-121a	Byzovaya, Komy ASSR, bone	18,320 $\pm$ 280
168	TA-121	Byzovaya, Komy ASSR, bone	25,450 $\pm$ 280
169	LE-3048	Byzovaya, upper layer, bone	14,150 $\pm$ 150
170	LE-3047	Byzovaya VI, Ilp., P-85, bone	25,740 $\pm$ 500
171	LE-3059	Medvegiya cave, Pechora River, Layer A	12,230 $\pm$ 100
172	LE-3060	Medvegiya cave, as above, Layer B	16,130 $\pm$ 150

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