

# CHRONOMETRY OF THE ROMANIAN MIDDLE AND UPPER PALAEOLITHIC: IMPLICATIONS OF CURRENT RADIOCARBON DATING RESULTS

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## BACKGROUND

A principal hindrance in establishing sound understanding of the succession of Palaeolithic technocomplexes through time and space in Romania has been the lack of a firm, absolute chronometric reference base. Limited accounting of their relative temporal placement has nonetheless been hypothesized. It is based for the most part on generalized studies and correlations of artifact assemblages within individual archaeological stations and correlation of this, along with some stratigraphic data, with that from other stations. Data on megafauna, but not microfauna, were also often included, as were also a few isolated radiocarbon dates. As praiseworthy these pioneering efforts have been, precise temporal ordering of technocomplexes has remained elusive.

One of the most important scientific tools recently developed in resolution of such chronometric problems is the radiocarbon ( $^{14}\text{C}$ ) method of dating organic archaeological remains<sup>1</sup>. Burleigh and Berger have recently reviewed the accuracy and limitations inherent in the method<sup>2</sup>. Efforts have intensified recently to increase accuracy and extend its use in the processing of materials other than wood charcoal. At the same time, ever smaller samples are needed for accurate laboratory processing. If some years ago the processing of bone samples was beset with technical problems in carbon extraction<sup>3</sup>, these have by now largely been overcome.

The latest technical refinement of the radiocarbon method, particle accelerator dating (PAD) promises even greater accuracy in establishment of chronometric ages of organic materials<sup>4</sup>. In conventional radiocarbon dating, 10 to 20 gram samples of clean charcoal are required for processing bone samples weighing between 200 and 500 grams. Accelerator dating, in contrast, depends on milligram samples, 1,000 to 10,000 times smaller. Since this new dating method is yet little known in Romania, it is characterized as follows: the minute quantity of carbon extracted from a sample is compressed into a pellet. In the accelerator apparatus, it is bombarded with positive ions, inducing the release of carbon atoms which are negatively charged. "Impelled by the high voltage that exists between the two ends of the accelerator, the carbon atoms are hurled the length of the machine. On the way, magnets pull the lighter carbon-12 atoms away from the carbon-14 atoms and direct each kind into a separate counter. Their ratio determines the age (of the carbon sample)"<sup>5</sup>. Precision in dating is within a range of plus or minus 250 years. Even greater accuracy is probable. Particle accelerator dating devices are operational in Great Britain, Canada, the United States and Japan.

<sup>1</sup> J. Michael, *Dating Methods in Archaeology*, New York, 1973; B. Fagan, *In the Beginning*, Boston, 1981, p. 131–136.

<sup>2</sup> R. Burleigh, *Journal of Archaeological Sciences*, 1, 1974, p. 68–87; R. Berger, in *XI<sup>e</sup> Congrès International, Colloque I*, p. 21–38.

<sup>3</sup> B. Fagan, *op. cit.*, p. 138–139.

<sup>4</sup> C. Bennet et al. *Science*, 201, 1978, p. 345–346; B. Fagan, *op. cit.*, p. 133–134.

<sup>5</sup> S. W., *Science*, 83, January-February, p. 34.

It seems clear this new dating procedure shall prove most useful in the processing of quite small organic samples relatively rich in carbon or larger samples containing relatively smaller quantities of carbon.

The first Romanian Middle Palaeolithic samples shall be submitted for PAD processing in the near future by the writer.

## TRADITIONAL RELATIVE DATING OF THE PALAEOLITHIC

Traditional relative dating strategies and stone artifact analysis procedures of Palaeolithic stations in Romania have in the past been loosely patterned after interpretational models developed in France in the 1920's and 1930's. More recent refinements developed there and elsewhere in Europe and beyond in excavation techniques, artifactual analysis and exploitation of other accessory archaeological data have been either rarely or casually applied here.

The many insightful preliminary reports by Nicolăescu-Plopșor<sup>6</sup> are indicative of research directions taken in the decades 1950–70. Today they are mainly of historical interest since the data base employed at the time was severely limited. Subsequent investigations by his followers M. Bitiri, Al. Păunescu, L. Roșu, Fl. Mogoșanu, V. Chirica, M. Brudiu and V. Boroneanț<sup>7</sup> have considerably expanded this base. All are to be credited with *substantive* contributions to new perspectives in the field of Paleolithic studies. In retrospect, it seems there has been and continues to take place a shift away from the earlier generalistic presentation and evaluation of the archaeological data to a more detailed, particularistic one. Progress is thus to be viewed as somewhat limited in scope but methodological refinements are expected in the near future. The new chronometric reference base offered in the present report, limited as it is, could play a positive role in these developments.

In the basic literature published before about 1980, cultural subdivisions were established mainly on the basis of worked stone tool typology and technology. As stated earlier, artifact assemblages in individual habitation levels at particular archaeological stations were correlated with one another and these, in turn, with what were believed to be similar levels in other sites, providing then a relative internal chronology. However, artifact recovery at many sites was subjectively biased, negatively influencing assemblage studies and interpretations. Frequently, only subjectively recognized worked stone tools were collected, the remaining "atypical" pieces and debitage being discarded in the field after counting and cursory recording of gross typological and technological attributes. Additionally, for particular regions subjectively characterized soil horizons — identified generally by color and sometimes texture — were associated with cultural levels and various hypothesized Late Pleistocene climatic cycles.

It is to be kept in mind that some Palaeolithic stations here have been excavated in arbitrary 20 cm horizontal excavation levels. Depth of archaeological finds was measured from a fixed datum, sometimes regardless of surface topography, natural cultural or geological stratification. In an idealized horizontal site situation this may not have made much difference. However, when natural stratification is on a slope, digging in such arbitrary levels can lead to significant admixture of cultural materials from different cultural and geological units and contexts.

Of the large number of Palaeolithic stations excavated here over the years, whole worked stone assemblages and other associated archaeological data remain to be published in exacting detail. What instead has appeared have been generally short summaries of tool groups found in various site levels.

Despite the handicap of this limited accounting of the prehistoric cultural record, successive evolutionary or developmental stages have nevertheless been proposed for the Middle Palaeolithic Mousterian and Upper Palaeolithic Aurignacian and Gravettian technocomplexes. While the former has been subdivided into at least six major regional traditions, the Aurignacian has been ordered into three and the Gravettian into four evolutionary stages. The Upper Palaeolithic sequences are now being challenged<sup>8</sup>. The better studied terminal Palaeolithic cultural manifestations have been recognized in older Epipalaeolithic and younger Mesolithic technocomplexes, each with major regional variants<sup>9</sup>. The validity of such hypothesized lines of cultu-

<sup>6</sup> E. Comșa, *Bibliografia paleoliticului și mezoliticului de pe teritoriul României*, București, 1978, p. 53–61

<sup>7</sup> *Ibidem*, p. 12–14, 63–65, 75–76, 45–47, 24, 19–20, 16–17.

<sup>8</sup> C. S. Nicolăescu-Plopșor, I. N. Moroșan, *Dacia*, N.S., 3, 1959, p. 9–33; C.S. Nicolăescu-Plopșor, *Dacia*, N.S., 5,

1961, p. 5–19; *idem*, *ArchAustr.*, 31, 1962, p. 74–95; C.S. Nicolăescu-Plopșor et al., *Dacia*, N.S., 10, 1966, p. 5–116; Al. Păunescu, *SCIVA*, 31, 1980, 4, p. 526–536; V. Dumitrescu, A. Bolomey, F. Mogoșanu, *Esquisse d'une préhistoire de la Roumanie*, București, 1983, p. 34–46.

<sup>9</sup> Al. Păunescu, *SCIVA*, 31, 1980, 4, p. 536–544.

ral development in time and space is difficult to judge, in the near absence of detailed assemblage studies. At the most, the above suggested reconstructions remain necessarily schematic and idealized until demonstrated otherwise. The effort now underway to re-examine this complex body of data on periodization is to be highly commended<sup>10</sup>.

### CURRENT DATING PROGRAM

Prior to the initial visit of the writer to Romania as National Academy of Sciences (U.S.A.) researcher in 1977–78, eleven radiocarbon dates had been obtained for Palaeolithic stations here<sup>11</sup>. An additional date appeared in 1980<sup>12</sup>. While here, the writer collected a series of radiocarbon samples from Mousterian levels at Ripiceni Izvor, Botoşani County and Mesolithic levels at Ostrovul Corbului, Mehedinţi County. Results were published in 1981 and 1982<sup>13</sup>.

With growing familiarity of chronometric problems involved in the cultural periodization of the Romanian Palaeolithic, a prime goal upon his return as Fulbright scholar 1982–84 has been the retrieval and processing of numerous new radiocarbon and other dating samples from selected sites in North Moldavia and Southwest Transylvania. Samples were collected under ideal conditions and packed in aluminum foil. Those with an estimated age in excess of 30,000 years BP (before present) were generally submitted for analysis to the Radiocarbon Laboratory, Laboratorium voor Algemene Natuurkunde, Rijksuniversiteit, Groningen, the Netherlands. Others with a lesser estimated age were submitted to Geochron Laboratories, Cambridge, Massachusetts, U.S.A. Special thanks are here expressed to Geochron for generously offering to gratuitously process bone samples as part of that laboratory's ongoing program to increase the reliability of bone radiocarbon dating. Where circumstances permitted, several different radiocarbon samples were taken from the same level. In some cases, such samples had to be combined in the laboratory for retrieval of sufficient carbon for processing; in other cases, even this measure failed to produce enough carbon. In still other cases, samples from the same level and feature were submitted to both Groningen and Cambridge with interesting results. They are discussed later.

Most of the radiocarbon age determinations reported here are for samples collected in the period 1981–82. Results for those collected in 1983 should become available in 1984.

Ivory samples collected from the lowest two Mousterian habitation levels of Ripiceni Izvor and bone samples from Peştera Cioarei-Borosteni in 1977 and 1983 respectively are to be processed by the particle accelerator method (PAD) in the United States. Accessory absolute dating of selected burned rock and soil samples from Upper Palaeolithic levels at Mitoc Malu Galben, Moldavia, by the thermoluminescence method are being undertaken by the University of Bordeaux, France.

Although the absolute radiocarbon age determinations presented here are, relatively speaking, few in number, it is to be hoped they shall aid in establishing a more reliable geochronology of the Romanian Palaeolithic or minimally, parts of it. Perhaps they shall provide fertile ground for reconsideration and rethinking of the traditional system of cultural periodization. Some revisions do seem eminent, however limited the precise accounting of the material culture record now seems.

For the sake of completeness, radiocarbon dates obtained in earlier years from the Berlin (Bln) dating facility are also listed. They were obtained from the Zentralinstitut für Alte Geschichte und Archäologie — Bereich Ur- und Frühgeschichte (Deutsche Akademie der Wissenschaften zu Berlin).

Finally, an inadvertent secondary challenge arising out of the dates presented here and those forthcoming will be their application, along with appropriate palaeoenvironmental and rigorous scientific study of the cultural record, to resolution of one of the great puzzles facing European archaeology and physical anthropology. Reference is made to the locus of replacement or succession of *Homo sapiens neanderthalensis* by *Homo sapiens sapiens*. Smith, in a recent highly acclaimed report, suggests with sound reasoning the change seems to have taken place either directly in or proximal to the Pannonian Basin of Southcentral Europe, a region which includes the Romanian lands<sup>14</sup>. According to Nicolae Miriţoiu, Bucharest (personal communication), human remains in probable Palaeolithic culture contexts are known from about six sites in Romania:

<sup>10</sup> V. Dumitrescu, A. Bolomey, F. Mogoşanu, *op. cit.*, p. 34–36.

<sup>11</sup> Personal communication, Al. Păunescu.

<sup>12</sup> M. Brudiu, SCIVA, 31, 1980, 3, p. 429.

<sup>13</sup> K. Honea, AJA, 85, 1981, p. 483–486; *idem*, SCIVA, 33, 1982, 2, p. 216–221.

<sup>14</sup> F. Smith, Current Anthropology, 23, 1982, 6, p. 667–703.

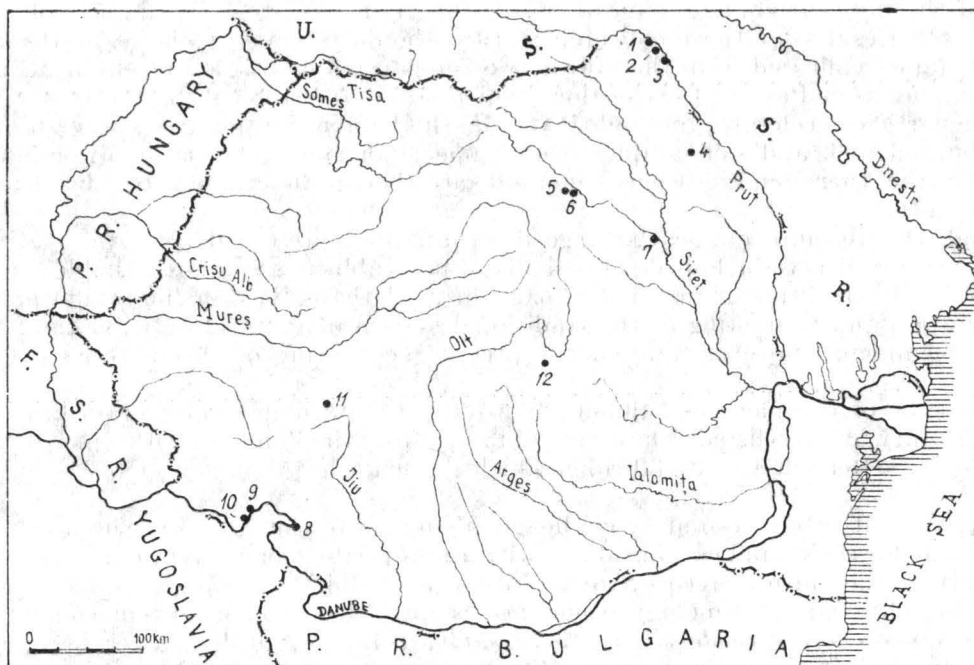
Peștera Cioclovina : skull ; Peștera Baia de Fier : skull ; Peștera "la Adam" : tooth ; Peștera Bordul Mare-Ohaba Ponor : phalanges ; Peștera Hoților : various human remains and Giurgiu Malu Roșu : skull frontal. Clearly these unique finds deserve renewed study by specialist's using sophisticated modern methods, including PAD chronometrics and re-excavation — where possible — of stations in which the remains were discovered. Be it stated in advance, however, that provenance information on some of the finds must also be re-examined and verified<sup>15</sup>.

## PALAEOENVIRONMENTAL RECONSTRUCTIONS AND RADIOCARBON DATING

Without doubt, one of the most significant events in Romanian Palaeolithic research was the 1980 publication of Cârciumar's detailed study, in an archaeological context, of Late Pleistocene environments and their estimated chronology<sup>16</sup>. A construct, based on palynological and other interdisciplinary studies, was offered outlining a series of well defined fluctuations believed to characterize the Last Interglacial, Würm Glacial and early Holocene. These, in turn, were correlated with the record in West, Northwest and Central Europe. Correlation of radiocarbon dates for late Mousterian levels at Ripiceni Izvor published in 1981 by the present writer indicate the soundness of Cârciumar's scheme for at least a part of the Late Pleistocene sequence<sup>17</sup>. It is expected an evaluation of the whole body of new dates in the current report will also be largely supportive of Cârciumar's reconstructions.

## CURRENT CHRONOMATIC DATA BASE

Presented below are the results of all the radiocarbon age determinations obtained thus far for Palaeolithic occupation levels in twelve Romanian stations (Map I). The information is contained in two series of tables, A and B.



Map I. Approximate location of Palaeolithic stations discussed in text.

1 Crasnaleuca-Lutărie; 2 Mitoc Malu Galben; 3 Ripiceni-Izvor; 4 Erbiceni; 5 Bistricioara-Lutărie; 6 Ceahlău-Dirțu; 7 Lespezi; 8 Ostrovu Corbului; 9 Ogradena-Icoana; 10 Cuina Turcului-Dubova; 11 Bordu Mare — Ohaba Ponor; 12 Gura Cheii-Rîșnov.

<sup>15</sup> Al. Păunescu, SCIVA, 31, 1980, 4, p. 535; O. Necrasov, M. Cristescu, Homo, 16, 1965, 3, p. 129–165.

<sup>16</sup> M. Cârciumar, *Mediul geografic în pleistocenul superior și culturile paleolitice din România*, București, 1980.

<sup>17</sup> M. Cârciumar, SCIVA, 33, 1982, 4, p. 396–401.

The first (A) series, quite detailed are arranged in alphabetical order by site name (abbreviated in parentheses) and name of county in which it is located. Extracted information is then utilized in the second (B) series of tables, presented in a following section. Column headings in both should be self explanatory.

In the first series, A I to A XII, samples are listed in sequential order of recovery below a fixed datum. Where known, material processed is identified, laboratory number given, results in years before present (BP) cited as well as the respective temporal range. Cultural association and level refer exclusively to the relative stratigraphic occurrence in depth below datum in each station. No definitive reference to any particular cultural or evolutionary stage is implied since the data for that are largely outstanding. These tables are the more complex of the two series since they serve as the primary chronometric data base.

Essential data derived from these are presented in the simplified second (B I to B IV) series of tables. Dates are given in reverse chronological order — from recent to early — regardless of depth of recovery in individual stations.

With the exception of a few dating results produced at the Berlin (Bl<sub>n</sub>) laboratory all other samples were processed either at Cambridge (GX) or Groningen (Gr<sub>N</sub>), the fewest at Dallas (SMU). Of the three latter groups of samples, most were personally collected by the writer. A few were retrieved by colleagues here under his instructions. The GX and SMU dates are based upon the Libby half-life for <sup>14</sup>C of 5570 years. The BP date is referenced to A.D. 1950.

#### A. RADIOCARBON AGE DETERMINATIONS BY INDIVIDUAL STATIONS

Of five Gravettian levels in this station (II–VI), only II, III and IV provide dating results. Samples 1 and 2, both from Gravettian level IV — although processed by different laboratories — suggest an averaged medial date of about 19,220  $\pm$  635 BP (maximally 19,850 and minimally 18,580 BP). Samples 3 and 4, from Gravettian level III, average 19,550  $\pm$  1250

Table A 1

Bistricioara-Lutărie II (BL), Neamț County<sup>18</sup>

Sample	Depth below Datum	Material Processed	Laboratory Number	Results B.P.	Range	Cultural Association and Level	Remarks
1	–0.87–0.96 m	Charcoal	GrN 10528	19,400 $\pm$ 350	19,750–19,050	Gravettian IV	Corrected
2	–0.95–1.03 m	Charcoal	GX 8730	19,055 $\pm$ 925	19,980–18,130	Gravettian IV	—
3	–1.08–1.18 m	Charcoal	GX 8728	18,800 $\pm$ 1200	20,000–17,600	Gravettian III	—
4	–1.18–1.22 m	Charcoal	GX 8729	20,300 $\pm$ 1300	21,000–19,000	Gravettian III	—
5	–1.35–1.46 m	Charcoal	GX 8726	20,995 $\pm$ 875	21,870–20,120	Gravettian II	—
6	–1.50–1.65 m	Unburnt bone	GX 8727-G	23,450 $\pm$ 2000/ –1450	25,450–22,000	Gravettian II	—
7	–1.95–2.20 m	Charcoal	GrN 10529	27,350 $\pm$ 1300	28,650–26,050	Aurignacian I	Corrected
8	–1.95–2.20 m	Unburnt bone	GrN 11586	28,010 $\pm$ 170	28,180–27,840	Aurignacian I	Sample from GrN 10529: (Corrected)
9	–2.00–2.15	Burnt bone	GX 8845-G	23,560 $\pm$ 1180/ –980	24,740–22,580	Aurignacian I	Sample from GX 8844
10	–2.00–2.15 m	Charcoal	GX 8844	27,350 $\pm$ 2100/ –1500	29,450–26,850	Aurignacian I	—

BP (maximally 20,550, minimally 18,300 BP). Gravettian level II also has produced two dates: sample 5 charcoal, from the upper part of the level, assays at 20,995  $\pm$  875 BP (maximal range 21,870 and minimal 20,120 BP). Sample 6 unburnt bone, from the lower part of the level, dates to 23,450  $\pm$  2000/–1450 BP. It seems too old in relation to the sample 5 charcoal date but could be correct. Aurignacian level I dates from samples 7 and 8 agree rather closely, though one is from charcoal, the other from unburnt bone. Together, they suggest an averaged medial date of 27,350  $\pm$  735 BP (maximally 28,415, minimally 26,945 BP). Sample 10 charcoal, from the same Aurignacian level I, processed at a different laboratory, assays to 27,350  $\pm$  2100/–1500 BP (maximally 29,450, minimally 26,850 BP). It appears to correlate rather closely with the samples

<sup>18</sup> C. S. Nicolăescu-Plopșor, Al. Păunescu, Fl. Mogoșanu, M. Cărciumaru, P. Vasilescu, SCIVA, 28, 1977, 2, p. 157–Dacia, N.S. 10, 1966, p. 36–47; Al. Păunescu, E. Cărciumaru, 183; M. Cărciumaru, *op. cit.*, p. 16)–170.

7 and 8 results. The sample 9 burnt bone, retrieved from sample 10, has produced an unexplainably anomalous dating result.

Table A II  
Bordul Mare-Ohaba Ponor (BM), Hunedoara County<sup>19</sup>

Sample	Depth below Datum	Material Processed	Laboratory Number	Results BP	Range	Cultural Association and Level	Remarks
1	-1.70-1.80 m	Charcoal	GrN 11618	39,200 ± 4500/ -2900	43,700-36,300	Carpathian Moustierian III A	Four m west GrN 11617
2	-1.48-1.52 m	Charcoal	GrN 11617	> 41,000	—	Carpathian Moustierian III A	—

Considered together, the results from samples 1 and 2 suggest that dating of the Carpathian Moustierian IIIa level in this important station is probably in the maximal range of 43,700 BP.

Table A III  
Ceahlău-Dirîu (CD), Neamţ County<sup>20</sup>

Sample	Depth below Datum	Material Processed	Laboratory Number	Results BP	Range	Cultural Association and Level	Remarks
1	-1.68-1.71 m	Charcoal	GX 9415	25,450 ± 4450/ -2850	29,900-22,600	Aurignacian I	Small sample
2	-1.68-1.71 m	Unburnt bone	GX 9416	—	—	Aurignacian I	Sample too small

### Comments

The single sample 1 date at 25,450 ± 4450/-2850 BP has a maximal range of 29,900 and minimal of 22,600 BP. Compare to above Bistricioara-Lutărie samples 7, 8 and 10. Sample 2 contained too small a quantity of carbon to process.

Table A IV  
Crasnaleuca-Lutărie, (CL), Botoşani County<sup>21</sup>

Sample	Depth below Datum	Material Processed	Laboratory Number	Results BP	Range	Cultural Association and Level	Remarks
1	-6.60-6.75 m	Charcoal	Bln 1443	19,460 ± 220	19,680-19,240	Gravettian IV	—

### Comments

The single sample produced a date of 19,460 ± 220 BP (maximally 19,680, minimally 19,240) for level IV. Compare to above Bistricioara-Lutărie samples 1 and 2, and the below Mitoc samples 5, 6 and 8.

Table A V  
Cuina Turcului-Dubova (CTD), Mehedinţi County<sup>22</sup>

Sample	Depth below Datum	Material Processed	Laboratory Number	Results BP	Range	Cultural Association and Level	Remarks
1	?	Charcoal	Bln 802	10,125 ± 200	10,325-9,925	Epipalaeolithic II	—
2	?	Charcoal	Bln 804	12,050 ± 120	12,170-11,930	Epipalaeolithic I	—
3	?	Charcoal	Bln 803	12,600 ± 120	12,720-12,480	Epipalaeolithic I	—

<sup>19</sup> C. S. Nicolăescu-Plopşor, Dr. N. Haas, Al. Păunescu, Al. Bolomey, *Materiale*, 2, 1957, p. 41-48; M. Cărciumaru, *op. cit.*, p. 84-90.

<sup>20</sup> C. S. Nicolăescu-Plopşor, Al. Păunescu, Fl. Mogoşanu, *op. cit.*, p. 73-87; Al. Păunescu, E. Cărciumaru, M. Cărciu-

maru, P. Vasilescu, *op. cit.*, p. 158-167; M. Cărciumaru *op. cit.*, p. 169-170.

<sup>21</sup> M. Brudiu, *op. cit.*, p. 425-443.

<sup>22</sup> Al. Păunescu, Tibiscus, 1978, p. 11-56.

## Comments

Epipaleolithic level II assays at  $10,125 \pm 200$  BP (maximally 10,325 and minimally 9925 BP) (sample 1). Samples 2 and 3, if indeed from the exact same locus in level I, average  $12,325 \pm 120$  BP (maximally 12,445 and minimally 12,155).

Table A VI

Erbiceni (E), Iași County <sup>23</sup>

Sample	Depth below Datum	Material Processed	Laboratory Number	Results BP	Range	Cultural Association and Level	Remarks
1	-1.42--1.55 m	Unburnt bone	GN 9417	$7,850 \pm 215$	8065--7635	Northwest Pontic Tardenosian I	First date SE European Tardenoisian

## Comments

Sample 1, of unburnt bone, assays at  $7850 \pm 215$  BP (maximally to 8065 and minimally 7635 BP). This represents the first dating of the Northwest Pontic Tardenoisian in the Black Sea region. Compare to the dating of the Mesolithic levels of Ostrovul Corbului (Table A XI) and Ogradena Icoana (Table A X).

Table A VII

Gura Cheii-Rîșnov (GCR), Brașov County <sup>24</sup>

Sample	Depth below Datum	Material Processed	Laboratory Number	Results BP	Range	Cultural Association and Level	Remarks
1	1.20--1.27m	Unburnt bone	GrN 11619	$29,700 \pm 1700$ -- 1400	31,400--27,300	Uppermost limit of Mousterian level	Believed associated Carpathian Mousterian

## Comments

The large sample of unburnt bone, along with a small quantity of charcoal, comprising sample 1, produces a date of  $29,700 \pm 1700/-1400$  BP (maximally 31,400, minimally 27,300 BP). The sample stems from a hearth at the base of a culturally sterile sedimentary unit situated directly at the interface of a Carpathian Mousterian level. The sample contained little carbon and thus the date is best considered minimal. The hearth is believed to be associated with the Mousterian level below. Alternative interpretations, are of course, possible.

Table A VIII

Lespezi (L), Bacău county <sup>25</sup>

Sample	Depth below Datum	Material Processed	Laboratory Number	Results BP	Range	Cultural Association and Level	Remarks
1	-1.40--2.20 m	Charcoal	Bln 805	$17,620 \pm 320$	17,940--17,300	Gravettian II	—
2	-2.50--3.00 m	Charcoal	Bln 806	$18,110 \pm 300$	18,410--17,810	Gravettian III	—
3	-3.80--4.50 m	Charcoal	Bln 808	$18,020 \pm 350$	18,370--17,670	Gravettian V	--

## Comments

Levels are listed from top to bottom. It seems that labelling of samples 2 and 3 could have been reversed. The samples, rather than coming from charcoal concentrations, were collected in excavation units some 50 to 80 m in thickness.

<sup>23</sup> Al. Păunescu, SCIVA, 30, 1979, 4, p. 507--526; idem SCIVA, 32, 1981, 4, p. 479--509.

<sup>24</sup> C. S. Nicolăescu-Plopșor, Al. Păunescu, I. Pop, Materiale, 8, 1971, p. 113--118; M. Cărciumaru, *op. cit.*,

p. 100--107.

<sup>25</sup> M. Bitiri, V. Căpitanu, Carpica, 5, 1972, p. 39--67; M. Bitiri, M. Cărciumaru, SCIVA, 30, 1981, 1, p. 3--19.

Table A IX  
Mitoc Malu Galben (MMG), Botoșani county <sup>26</sup>

Sample	Depth below Datum	Material Processed	Laboratory Number	Results BP	Range	Cultural Association and Level	Remarks
1	-5.00 m	Charcoal	GX 9423	17,300 ± 2100/ -1670	19,400 - 15,630	Gravettian	—
2	-5.00 m	Burnt bone	GX 9427	—	—	Gravettian	Sample too small
3	-5.00 m	Charcoal	GX 8723	> 33,000	—	Gravettian	Anomalous
4	-5.60 m	Charcoal	GX 9424	> 21,000	—	Gravettian	Very small sample
5	-5.60 m	Charcoal	GX 8724	19,900 ± 990	20,900 - 18,920	Gravettian	—
6	-6.10 m	Burnt bone	GX 9429	19,900 ± 1050/ -930	20,830 - 18,970	Gravettian	—
7	-6.40 m	Charcoal	GX 8725	> 28,700	—	Gravettian	Anomalous
8	-6.60 m	Charcoal	GX 8503	20,945 ± 850	21,795 - 20,095	Gravettian	—
9	-6.60 m	Charcoal	GX 9421	—	—	Gravettian	Sample too small
10	-6.60 m	Charcoal	GX 9420	22,050 ± 1250	23,300 - 20,800	Gravettian	—
11	-6.80 m	Charcoal	GX 9422	24,620 ± 810	25,430 - 23,810	Gravettian	—
12	-7.00 m	Burnt bone	GX 9425	24,820 ± 850	25,670 - 23,970	Gravettian	—
13	-7.10 m	Charcoal	GX 9418	26,700 ± 1040/	27,740 - 25,660	Gravettian	Associated with amulet atelier 27
14	-7.10 m	Charcoal	GX 9419	—	—	Gravettian	Sample too small
15	-7.20 m	Charcoal	GX 9428	—	—	Gravettian	Sample too small

This station, in the Moldavian Middle Prut Valley, is the areally largest, deepest and most significant stratified Middle and Upper Palaeolithic site remaining in Romania. Cultural deposits are at least 14.0 m deep and include from bottom to top "Clactonian", Mousterian, Aurignacian, Gravettian and post-Palaeolithic cultural deposits. Initial excavations were conducted at Mitoc Malu Galben in 1956 by Nicolăescu-Plopșor and a planned ten year excavation program was begun there in 1981 by Chirica. The writer participated in the 1982 and 1983 excavations, during which he collected a substantive number of dating samples. The absolute cultural and geological stratification have not yet been established nor are stone assemblage analyses complete. The lowest Gravettian level was reached in 1983 at about 7.5 m. Dating results cited in this report, all in Gravettian contexts, are therefore listed by depth of recovery below the station datum point.

Fifteen radiocarbon samples were submitted for assay. Eight produced adequate results (samples 1, 5, 6, 8, 10, 11, 12 and 13). Samples 2, 9, 14 and 15, however, could not be fully processed due to low carbon content. On the other hand, samples 3, 4 and 7 produced anomalous dating results. They are not readily explainable since no readily visible traces of geological or other disturbances were detected during excavation.

The eight samples giving adequate dating results require some discussion. They extend over a nearly 10,000 year period, making them the longest dating series yet to become available for the Romanian East Gravettian.

Sample 1 charcoal, recovered from a depth of -5.00 m, produces a date of 17,300 ± 2100/-1670 BP, with a maximal range of 19,400 and minimal one of 15,630 BP. Sample 5 charcoal from -5.60 m assayed at 19,910 ± 990 BP, ranging maximally to 20,900 and minimally 18,920 BP. This is quite close to the Crasnaleuca date cited above of 19,460 ± 220 BP, but also to the burnt bone date from -6.10 m, which assayed at 19,900 ± 1050/930 BP, sample 6, ranging maximally to 20,830 and minimally to 18,970 BP. Sample 8 charcoal from -6.60 m is little later at 20,945 ± 850 BP, ranging maximally to 21,795 and minimally 20,095 BP. (Incidentally this date virtually duplicates that from Bistricioara Lutărie II sample 5 from level II — see Table A I — at 20,995 ± 875 BP, suggesting contemporaneity of Gravettian occupations at the two

<sup>26</sup> C. S. Nicolăescu-Plopșor, *Materiale*, 6, 1959, p. 11—19; V. Chirica, *Așezările paleolitice de la Mitoc*, Teza de doc-

torat, Universit. "Al. I. Cuza" Iași, 1980, p. 1—211; A. I. Păunescu, V. Chirica, *MSSI*, série IV, t. II, 1977, p. 64—69.



stations). The Mitoc sample 10 charcoal, also from  $-6.60$  m, produces a date of  $22,050 \pm 1250$  BP, ranging maximally from  $23,300$  to minimally  $20,800$  BP. Since it is from the same excavation unit and depth as the foregoing sample 8, the true age would seem to fall in the minimal range of about  $20,000 \pm$  BP. This can be debated however. The ages of samples 10 and 11 are so close to one another that essential contemporaneity of the different levels from which they stem appears implied. The excavation units, however, are different and the materials processed too. Sample 11 charcoal, from  $-6.80$  m, assays at  $24,620 \pm 810$  BP, ranging from maximally  $25,430$  to minimally  $23,810$  BP. The sample 12 burnt bone from  $-7.00$  similarly assays at  $24,820 \pm 810$  BP, ranging maximally to  $25,670$  and minimally  $23,970$  BP. The sample 13 charcoal from  $-7.10$  m, associated with atelier 27, has a rather surprising date of  $26,700 \pm 1040$  BP, ranging maximally from  $27,740$  to minimally  $25,660$  BP. Although from a habitation level just  $10$  cm below the previously cited sample 12, the age difference between the two samples is about  $2,000$  years. Additional radiocarbon samples are certainly desirable. This could represent an occupational hiatus but other unclear factors could be involved. Should the sample 13 date be confirmed, then it has fargoing implications. The carved stone pendant discovered in the atelier becomes not only the oldest Palaeolithic work of art of Romania but is roughly contemporary with related pieces in Central Europe. Also, the above date is the oldest one yet fixed for the East Gravettian in Romania. Finally, it is nearly coeval with the Aurignacian date for Bistricioara Lutărie II (Table A I, sample 10 at  $27,350 \pm 2100/-1500$  or  $29,450$  to  $26,850$  BP).

The radiocarbon specimens collected in 1983 from various levels between  $-7.85$  to  $9.95$  m are now being processed. Results will become available in 1984. In the overall context of what is now known of the radiocarbon dating of the Upper Palaeolithic in Romania, the expected results should mark transition from Aurignacian to Gravettian times and conceivably late Mousterian to Aurignacian times. The dates, of course, shall only become meaningful when artifact analyses have been completed and other accessory archaeological data are available.

Table A X

Ogradena Icoana (OI), Caraş-Severin county <sup>27</sup>

Sample	Depth below Datum	Material Processed	Laboratory Number	Results BP	Range	Cultural Association and Level	Remarks
1	?	Charcoal	Bln?	$7760 \pm 110$	7870–7650	Mesolithic II	—
2	?	Charcoal	Bln?	$8070 \pm 130$	8200–7940	Mesolithic II	—

## Comments

Both samples are said to come from Mesolithic level II; other levels were not dated. If indeed from the same excavation level, they appear to be rather widely separated from one another in time. Sample 1 charcoal dates to  $7760 \pm 110$  BP, with a maximal range of  $7870$  and minimal of  $7650$  BP. Sample 2 to  $8070 \pm 130$  BP, maximally to  $8200$  and minimally to  $7940$  BP. If a single event is represented in the two dates, then they average  $7865 \pm 120$  BP. Whatever the case, the dates are to be considered in conjunction with those from Erbiceni (Table A VI) and Ostrovul Corbului (Table A XI) below.

Table A XI

Ostrovul Corbului (OC), Mehedinţi county <sup>28</sup>

Sample	Depth below Datum	Material Processed	Laboratory Number	Results BP	Range	Cultural Association and level	Remarks
1	?	Charcoal	SMU 588	$7,827 \pm 237$	8,064–7,590	Mesolithic I	—
2	?	Charcoal	SMU 587	$8,093 \pm 237$	8,330–7,856	Mesolithic I	—

<sup>27</sup> V. Boroneanţ, *Dacia*, N.S., 17, 1973, p. 5–38.Honea, *AJA*, 85, 1981, p. 484–485; idem, *SCIVA*, 33, 1982,<sup>28</sup> F. Mogoşanu, *SCIVA*, 29, 1978, 3, p. 337–351; K. p. 119–120.

## Comments

The two sample dates are here viewed as representing a single point in time. They average  $7860 \pm 237$  BP, and range maximally from 8197 to minimally 7723 BP<sup>19</sup>. They are to be referenced to those directly above and that from Erbiceni (Table A VI).

Table A XII

Ripiceni-Izvor (RI), Botoşani county<sup>29</sup> (MAT: Mousterian of Acheulian Tradition with Levallois Technique; TM: Typical Mousterian with Levallois Technique)

Sample	Depth below Datum	Material Processed	Laboratory Number	Results BP	Range	Cultural Association and Level	Remarks
1	— 3.00 m	Charcoal	Bln 809	$28,420 \pm 400$	28,820—28,020	Aurignacian I	—
2	— 6.60 m	Charcoal	Bln 810	$28,780 \pm 2000$	30,780—26,780	MAT IV	Anomalous
3	— 6.60—6.68 m	Charcoal, burnt bone	GrN 9210	$40,200 + 1100/-1000$	41,300—39,200	MAT; IV—V interface	—
4	— 7.30 m	Charcoal, burnt bone	GrN 9209	$42,500 + 1300/-1100$	43,800—41,400	MAT IV	—
5	— 7.30 m	Charcoal, burnt bone	GrN 9207	$43,800 + 1100/-1000$	44,900—42,800	MAT IV	—
6	— 7.30 m	Charcoal burnt bone	GrN 9208	$44,800 + 1300/-1100$	46,100—43,700	MAT IV	—
7	— 8.00 m	Burnt bone	GrN 11571	$45,000 + 1400/-1200$	46,400—43,800	TM III	Alkali extract sample 8
8	— 8.00 m	Burnt bone	GrN 11230	$46,400 + 4700/-2900$	51,100—43,500	TM III	Collagen fraction
9	— 8.00 m	Charcoal	Bln 811	$>36,950$	—	TM III	Anomalous

## Comments

The sample 1 charcoal date for the Aurignacian I level, obtained in Berlin some years ago, appears consistent with other Aurignacian dates presented in the present report (Bistricioara-Lutărie, Table A I and Ceahlău-Dirţu, Table A III). Ripiceni Izvor results are (Bln 809)  $28,420 \pm 400$  BP, maximally 28,820 and minimally 28,020 BP<sup>30</sup>. Sample 2 charcoal, recovered about 3.50 m deeper, produced an astonishing age of  $28,780 \pm 2000$  BP for the level IV Mousterian of Acheulian Tradition (MAT)<sup>31</sup>. (Both these samples were collected in the 1960's). Its validity has been accepted only with the most serious reservations. Recently, it has been challenged and is here rejected with finality<sup>32</sup>. The sample 3 combined charcoal-burnt bone was recovered from the interface of levels IV and V and is associated with a MAT habitation complex. It assays to  $40,200 + 1100/-1000$  BP, maximally 41,300 and minimally 39,200 BP. Samples 4, 5 and 6, also of combined charcoal and burnt bone, were collected from the base of level IV, also containing a MAT habitation complex. They average  $43,700 + 1230/-1055$  BP, ranging maximally from 44,930 to minimally 42,645 BP. These dates replace the erroneous one of sample 2 above. Sample 7, with an age of  $45,000 + 1400/-1200$  BP, is an alkali extract containing contaminants from sample 8 in level III. It was processed as a control sample only, confirming results obtained for sample 8. Sample 8 burnt bone, associated with a Typical Mousterian (TM) habitation complex in level III, assays at  $46,400 + 4700/-2900$  BP, maximally ranging to 51,000 and minimally 43,500 BP. It is the earliest radiocarbon date obtained for a Mousterian site in Romania and among the earliest obtained in continental Europe. It is referable solely to level III. Sample 9 charcoal, also from level III assayed some years ago in the Berlin laboratory to  $>36,950$  BP<sup>33</sup>. It is

<sup>29</sup> Al. Păunescu, Dacia, N.S., 9, 1965; p. 5—32; A. Păunescu, A. Conea, M. Cărciumaru, V. Codarcea, A.V. Grosu, R. Popoviciu, SCIVA, 27, 1976, 1, p. 5—19; Al. Păunescu, SCIVA, 29, 1978, 3, p. 317—333; M. Cărciumaru, *op. cit.*, p. 107—120; A. Păunescu, V. Chirica, *op. cit.*, p. 57—64.

<sup>30</sup> Al. Păunescu, A. Conea, M. Cărciumaru, V. Codarcea, A. V. Grosu, R. Popoviciu, SCIVA, 2, 1976, 1, p. 8; M. Cărciumaru, *op. cit.*, p. 114.

<sup>31</sup> Al. Păunescu, A. Conea, M. Cărciumaru, V. Codarcea, A. V. Grosu, R. Popoviciu, SCIVA, 27, 1976, 1, p. 7; M. Cărciumaru, SCIVA, 33, 1982, 4, p. 396—401.

<sup>32</sup> K. Honea, AJA, 85, 1981, p. 484; M. Cărciumaru, *op. cit.*, p. 396—397.

<sup>33</sup> Al. Păunescu et al., *op. cit.*, p. 6; M. Cărciumaru, *Mediul geografic...*, p. 110; idem, SCIVA, 33, 1982, 4, p. 396.

here abandoned in favor of the results from sample 8. Ivory samples retrieved by the writer in 1977 from Typical Mousterian levels II and I are to be processed soon by the particle accelerator dating (PAD) method.

## B. RADIOCARBON AGE DETERMINATIONS IN CHRONOLOGICAL ORDER

Radiocarbon dates in the below series of tables, BI to BIV, are arranged in reverse chronological order from recent to early. They are to be considered in reference to the tables presented above.

Station abbreviations used are as follow :

BL = Bistricioara-Lutărie II; BM = Peștera Bordul Mare-Ohaba Ponor; CD = Ceahlău-Dîrțu; C = Crasnaleuca-Lutărie; CTD = Cuina Turcului-Dubova; E = Erbiceni; GCR = Gura Cheii-Rîșnov; L = Lespezi; MMG = Mitoc Malu Galben; OI = Ogradena-Icoana; OC = Ostrovul Corbului; RI = Ripiceni Izvor.

"Contextual Reliability" in these tables refers to the probable (+) or improbable (–) reliability of a particular date within the context of a sequence or suite of radiocarbon dates obtained for individual sites listed in tables A I to A XII. In the case of stations yielding but a few dates or a single one, the reliability factor is based on temporal correlations with dated levels in other sites belonging to what is assumed to be a cognate cultural horizon or technocomplex. Additionally considered are materials processed and dates produced from different materials in the same level or similar levels in other stations.

Let it be recalled at this point that, given secure provenance, dating results derived from charcoal samples seem to be the most reliable. However, the dates from the few burnt and unburnt bone samples may or may not be compatible with these. Generally, the Groningen bone dates seem to more readily fall into expected age ranges than do those from Geochron.

Given these reservations and other limiting factors of the data base, certain patterns are suggested in temporal placement of major components of the Middle and Upper Palaeolithic, Epipalaeolithic and Mesolithic periods in Romania.

Table B I

Site	Laboratory Number	Results BP	Range	Cultural Association and Level	Contextual Reliability
OI	Bln	7760 ± 110	7870–7650	Mesolithic II	–
OC	SMU 588	7827 ± 237	8064–7590	Mesolithic I b	+
E	GX 9417	7850 ± 215	8065–7635	Northwest Pontic Tardenoisian I	+
OI	Bln	8070 ± 130	8200–7940	Mesolithic II	–
OC	SMU 587	8093 ± 237	8330–7856	Mesolithic I a	+
CTD	Bln 802	10,125 ± 200	10,325–9925	Epipalaeolithic II	+
CTD	Bln 804	12,050 ± 120	12,170–11,930	Epipalaeolithic I	–
CTD	Bln 803	12,600 ± 120	12,720–12,480	Epipalaeolithic I	–
MMG	GX 9423	17,300 ± 2100 – 1670	19,400–15,630	Gravettian – 5.00 m	+
L	Bln	17,620 ± 320	17,940–17,300	Gravettian II	–
L	Bln	18,020 ± 350	18,370–17,670	Gravettian V	–
L	Bln	18,110 ± 300	18,410–17,810	Gravettian III	–
BL	GX 8728	18,800 ± 1200	20,000–17,600	Gravettian III	+

Table B II

Site	Laboratory Number	Results BP	Range	Cultural Association and Level	Contextual Reliability
BL	GX 8730	19,055 ± 925	19,980–18,130	Gravettian IV	+
BL	GrN 10528	19,400 ± 350	19,750–19,050	Gravettian IV	+
C	Bln 1443	19,460 ± 220	19,680–19,240	Gravettian IV	+
MMG	GX 8724	19,910 ± 990	20,900–18,920	Gravettian –5.60 m	+
MMG	GX 9429	19,900 ± 1050 –930	20,830–18,970	Gravettian –6.10 m	+
BL	GX 8729	20,300 ± 1300	21,600–19,000	Gravettian III	+
MMG	GX 8503	20,945 ± 850	21,795–20,095	Gravettian –6.60 m	+
BL	GX 8726	20,995 ± 875	21,870–20,120	Gravettian III	+
MMG	GX 9424	>21,000	–	Gravettian –5.60 m	–
MMG	GX 9420	22,050 ± 1250	23,300–20,800	Gravettian –6.60 m	+
BL	GX 8727-G	23,450 ± 2000 –1450	25,450–22,000	Gravettian II	+

Table B III

Site	Laboratory Number	Results BP	Range	Cultural Association and Level	Contextual Reliability
BL	GX 8845-G	23,560 ± 1180 –980	24,740–22,590	Aurignacian I Unburnt bone from GX 8844	–
MMG	GX 9422	24,620 ± 810	25,430–23,810	Gravettian –6.80 m	+
MMG	GX 9425	24,820 ± 850	25,670–23,970	Gravettian –7.00 m	+
GD	GX 9415	25,450 ± 4450 –2850	29,900–22,600	Aurignacian I	+
MMG	GX 9418	26,700 ± 1040	27,740–25,660	Gravettian –7.10 m (pendant)	+
BL	GrN 10529	27,350 ± 1300	28,650–26,050	Aurignacian I	+
BL	GX 8844	27,350 ± 2100 –1500	29,450–26,850	Aurignacian I	+
BL	GrN 11586	28,010 ± 170	28,180–27,840	Aurignacian I	+
RI	Bln 809	28,420 ± 400	28,820–28,020	Aurignacian I	+
RI	Bln 810	28,870 ± 2000	30,780–26,780	Mousterian of Acheulian Tradition, IV	–
MMG	GX 8725	>28,700	–	Gravettian –6.40 m	–

Table B IV

Site	Laboratory Number	Results BP	Range	Cultural Association and Level	Contextual Reliability
GCR	GrN 11619	29,700+1700 -1400	31,400-27,300	Carpathian Mousterian	+
MMG	GX 8723	>33,000	—	Gravettian -5.00 m	—
RI	Bln 811	>36,950	—	Typical Mousterian III	—
BM	GrN 11618	39,200+4500 -2900	43,700-36,300	Carpathian Mousterian III A	+
RI	GrN 9210	40,200+1100 -1000	41,300-39,200	Mousterian of Acheulian Tradition, interface IV-V	+
BM	GrN 11617	>41,000	—	Carpathian Mousterian III A	—
RI	GrN 9209	42,500+1300 -1100	43,800-41,400	Mousterian of Acheulian Tradition, IV	+
RI	GrN 9207	43,800+1100 -1000	44,900-42,800	Mousterian of Acheulian Tradition, IV	+
RI	GrN 9208	44,800+1300 -1100	46,100-43,800	Mousterian of Acheulian Tradition, IV	+
RI	GrN 11571	45,000+1400 -1200	46,400-43,800	Typical Mousterian III	+
RI	GrN 11230	46,400+4700 -2900	51,100-43,500	Typical Mousterian III	+

## PROJECT RESULTS AND INTERPRETATIONS

Despite the limitations of the currently available chronometric base, sufficient information is now on hand to permit establishment for the first time of a tenuous chronology of major parts of the Romanian Palaeolithic. More than forty radiocarbon dates from one or more levels in some twelve important archaeological stations comprise this reference base.

### MIDDLE PALAEOOLITHIC <sup>34</sup>

The earliest now reliable chronometric dating of the Mousterian Complex in Romania comes from level III at Ripiceni Izvor, Botoşani County. It is the artifactually richest level there. Derived from burned bone recovered in a habitation complex, it is (GrN 11230) 46,400+4700/-2900 BP and replaces Bln 811 at >36,950 BP obtained some years ago. Cultural associations are reported to be characterized by an assemblage belonging to the Typical Mousterian Tradition with Levallois Debitage <sup>35</sup>. The two earlier levels below this, containing similar assemblages, are of unknown date. This Groningen date is not only the earliest one for Romania but among the earliest for the Mousterian in continental Europe. Coincidentally, it is also the earliest one yet secured for constructed dwellings in East Europe <sup>36</sup>.

The averaged Groningen radiocarbon date of 43,700 BP for burned bone and charcoal in level IV contains an assemblage of the Mousterian of Acheulian Tradition (MAT) with Levallois Debitage. The dates for this level were first published by the writer in 1981 <sup>37</sup> and they have been substantiated by recent reconsideration of the level IV palaeoenvironmental record <sup>38</sup>.

The Groningen date from a hearth at the interface of levels IV and V (GrN 9210, 40,200+1100/-1000 BP) also pertains to a Mousterian of Acheulian Tradition (MAT) assemblage <sup>39</sup>. It

<sup>34</sup> C. S. Nicolăescu-Plopşor, *Dacia*, N.S., 1, 1957, p. 45-48.

<sup>35</sup> Al. Păunescu et al, *op. cit.*, p. 6; M. Cărciumaru, *Mediul geografic...* p. 116-117.

<sup>36</sup> K. Honea, *AJA*, 85, 1981, p. 484; idem, *SCIVA*, 33,

1982, 2, p. 219.

<sup>37</sup> Idem, *AJA*, 85, 1981, p. 484; M. Cărciumaru, *SCIVA*, 33, 1982, 4, p. 395-401.

<sup>38</sup> M. Cărciumaru, *op. cit.*, p. 395-401.

<sup>39</sup> Al. Păunescu et al., *op. cit.*, p. 7; M. Cărciumaru, *Mediul geografic...*, p. 116-117.

is the most recent yet obtained for the Mousterian Complex in Romania but *should not* be construed to mark the end phase of this complex since the undated level VI above is also Mousterian.

The previously mentioned Bln 810 date for level IV (28,780  $\pm$  2000 BP) of about 30,000 BP differs little from the Aurignacian level I above it (Bln 809, 28,420  $\pm$  400 BP). For this reason, it could have been assumed, either tacitly or implicitly, that the Mousterian Complex (MAT) survived in Romania some thousands of years later than in other parts of Europe. However, the Bln 810 date was never taken seriously and its probable error has recently been discussed in much detail<sup>40</sup>.

Two dates published here for the cave station Bordul Mare-Ohab Ponor, Hunedoara County, are the first to be secured for the distinctive Carpathian Mousterian Tradition, widespread in the mountains of southern and western Transylvania<sup>41</sup>. There are more than ten Mousterian habitation levels in this important cave. The tradition is marked by tools made of either quartzitic or quartz rocks, the locally most abundant and accessible material. Charcoal samples stem from level III a (GrN 11618 39,200  $\pm$  4500. — 2900 and GrN 11617 >41,000 BP). Together, they suggest a maximal age of about 43,700 BP. If this is so, then this level is, for all practical purposes, essentially contemporaneous with level IV at Ripiceni Izvor.

In the older traditional literature, the Carpathian Mousterian Tradition is viewed as having appeared late in time, perhaps from Central Europe<sup>42</sup>. It is also called by some researchers the Quartzitic Palaeolithic, or Cave Mousterian, and has been characterized in the recent literature as being typologically and technologically uniform through both time and space. Further, it is hypothesized by some to be a regional expression of the Charentian Mousterian and to have even survived essentially unchanged through the Upper Palaeolithic into the Mesolithic<sup>43</sup>. Clearly all the evidence needs to be reexamined. Additional radiocarbon dates are highly desirable.

The minimal date obtained for carbon-poor bone from the top of the final Carpathian Mousterian level in Gura Cheii-Rişnov cave, Braşov County, GrN 11619, 29,700  $\pm$  1700/ — 1400 BP, may mark a primary association. The undated level above the sterile unit contains cultural materials assigned the Aurignacian, and above this, a unit with Gravettian materials.

It now appears abundantly clear that, in light of the Groningen level IV radiocarbon dates for Ripiceni Izvor, traditional interpretations of both the Middle and Upper Palaeolithic complexes are in need of reevaluation and possibly reinterpretation.

## UPPER PALAEOLITHIC

### *Aurignacian :*

The Aurignacian in Romania is traditionally seen as having evolved out of an autochthonous Mousterian Tradition base in northern Moldavia about 30,000 BP<sup>44</sup>. It is believed to have lasted there until between 25,000 and 20,000 BP but to have survived much longer in Muntania, Oltenia and the Banat — perhaps even until the end of the last glacial<sup>45</sup>.

Attention is drawn to the new radiocarbon dates for the Aurignacian which have now become available for the Ceahlău area, Neamţ County, in westcentral Moldavia. It is of interest that the literature considers the Aurignacian there as occurring earlier in time than in other parts of Romania<sup>46</sup>.

The samples processed stem from what are typologically identified, within the traditional internal chronology, as late Middle Aurignacian levels<sup>47</sup>.

A Bistricioara-Lutărie II charcoal lot from Aurignacian level I assayed at 27,350  $\pm$  1300 BP (GrN 10529), while unburnt bone from the same locus produced a date of 28,010  $\pm$  170 BP (GrN 11586). Another charcoal sample from a nearby excavation unit in the same cultural level assayed at 27,350  $\pm$  2100/ — 1500 BP (GX 8844). Usually charcoal and bone dates should be considered apart but the above GrN lots, derived from a large sample from the same locus, are internally compatible with one another and are used in the following calculations. The ave-

<sup>40</sup> M. Cărciumaru, *op. cit.*, p. 107—118; idem, SCIVA, 33, 1982, 4, p. 395—401; K. Honea, AJA, 85, 1981, p. 483—486.

<sup>41</sup> C. S. Nicolăescu-Plopşor, *op. cit.*, p. 45—47; V. Dumitrescu, A. Bolomey, Fl. Mogoşanu, *op. cit.*, p. 34—37.

<sup>42</sup> C. S. Nicolăescu-Plopşor, *op. cit.*, p. 45—47; Fl. Mogoşanu, *Paleoliticul în Banat*, Bucureşti, 1978, p. 130—136; Al. Păunescu, SCIVA, 31, 1980, 4, p. 527.

<sup>43</sup> Fl. Mogoşanu, *op. cit.*, p. 132; V. Dumitrescu, A. Bolomey, Fl. Mogoşanu, *op. cit.*, p. 36.

<sup>44</sup> Al. Păunescu, *op. cit.*, p. 530; V. Dumitrescu, A. Bolomey, Fl. Mogoşanu, *op. cit.*, p. 41.

<sup>45</sup> Fl. Mogoşanu, *op. cit.*, p. 137.

<sup>46</sup> M. Cărciumaru, *Mediul geografic...*, p. 168.

<sup>47</sup> Al. Păunescu et al., SCIVA, 28, 1977, 2, p. 170; C.S. Nicolăescu-Plopşor, et al., Dacia, N.S., 10, 1966, p. 36—47.

aged medial range of these three dates is 27,570, with a maximal range of 28,760 and minimal of 26,910 BP.

The Dirțu charcoal (CX 9415), also associated with a late Middle Aurignacian occupation<sup>48</sup>, dates to 25,450 $\pm$ 4450/–2850, ranging maximally from 29,900 to minimally 22,600 BP.

In context, the sets of dates from these two stations are in large measure compatible with one another and thus indicative of approximative contemporaneity of Aurignacian occupations.

Considered within the above chronometric framework, the Ripiceni Izvor level I Aurignacian date appears both reasonable and accurate. As in the above cases, cultural associations are compatible with a Middle Aurignacian occupation<sup>49</sup>. Bln 809, at 28,420 $\pm$ 400, ranges maximally from only 28,820 to minimally 28,020 BP. It falls easily within the date ranges established for both Bistricioara-Lutărie and Dirțu. Rather than to the contrary, the Middle Aurignacian in both the Ceahlău and Ripiceni areas appears to have been synchronic and not diachronic. The Mitoc date for Gravettian sample 13 of 26,700 $\pm$ 1040 BP conjures up the possibility of temporal overlap of the Gravettian and Aurignacian.

The difference of some 10,000 years between this modest block of Middle Aurignacian dates and the most recent date for the Mousterian of Acheulian Tradition at Ripiceni Izvor presents no great mystery. In fact, it suggests little more than that an apparent, not real, temporal and cultural hiatus exists for the period of about 40,000 to 30,000 BP. After all, neither the final Mousterian, nor the early Aurignacian have yet been dated. It is a virtual certainty that future research in the Moldavian region will fill in this missing information. The deeply stratified station of Mitoc Malu Galben, to the northwest of Ripiceni Izvor, will doubtless play a major role in these investigations.

The radiocarbon dates now available for the Moldavian Middle Aurignacian, as traditionally defined, seem concentrated in a period of somewhat less than 30,000 BP. Because of this and rejection of the Berlin 810 date for end of the Mousterian, it seems rather more in order to search for beginnings of the Aurignacian before 30,000 BP, possibly by a measure of several thousands of years before.

The appreciable series of radiocarbon dates offered for the Gravettian further on negate, it seems, the possibility of the Moldavian Aurignacian surviving until 20,000 BP as suggested by sources quoted above. That it may have persisted until about 25,000 BP, however, is credible.

The highly speculative arguments maintaining persistence of the Aurignacian in some parts of Romania (Muntenia, Oltenia, the Banat) to the end of the last glacial remain just that. They are not supported by any evidence from the radiocarbon or another absolute dating record.

#### *East Gravettian :*

Considered recently by some authorities to have origins in the southern Russian Plain — the middle Dniestr area — the Romanian East Gravettian has been hypothesized to occur earliest in Moldavia, roughly between about 25,000 and 20,000 BP, and to have persisted there until the early Holocene<sup>50</sup>. It is also to be remarked that some researchers now consider the division of the East Gravettian here into four distinctive evolutionary stages may be too an artificial construct. Dumitrescu, Bolomey and Mogosanu (1983) propose instead only two stages, early (20,000 — 15,000 BP) and late (15,000 — 10,000 BP). The latter is seen as having been influenced by Magdalenoid traits emanating from the north and northeast. Be that as it may, in keeping with the postulated late survival of the Aurignacian in some parts of Romania, some maintain the Moldavian East Gravettian was coeval with the "late" Aurignacian in Muntenia, and, ipso facto, elsewhere, i.e., Oltenia and the Banat<sup>51</sup>. However, there are no radiocarbon dates to support this assumption. We have earlier indicated that cultural levels identified as "Middle" Aurignacian at Bistricioara-Lutărie II seem to temporally overlap with what is assumed to be an "Early" Gravettian level at Mitoc Malu Galben.

At the time the above relative chronology of the East Gravettian was formulated, extremely few radiocarbon age determinations, from Berlin, were available. More specifically, an inferred chronology was derived principally from an internal temporal framework based on comparative tool techno-typological studies.

<sup>48</sup> C. S. Nicolăescu-Plopșor et al., *op. cit.*, p. 73–87.

<sup>49</sup> Al. Păunescu et al., SCIVA, 27, 1978, 1, p. 7–8.

<sup>50</sup> Al. Păunescu, SCIVA, 31, 1980, 4, p. 531; V. Chirica,

*Les fins des temps glaciaires en Europe*, Paris, 1979, p. 850–868.

<sup>51</sup> Fl. Mogoșanu, *Paleoliticul în Banat*, p. 137–138.



As of the present, the earliest available dating of the Moldavian East Gravettian at Mitoc Malu Galben is (GX 9418) 26,700  $\pm$  1040, maximally 27,740 and minimally 25,660 BP. The most recent dating of it, also at this station, is (GX 9423) 17,300  $\pm$  2100/1670, minimally 15,630 BP.

A combined total of 14 secure radiocarbon dates are available for various Gravettian levels at the stations Mitoc Malu Galben (Table A IX, 8) and Bistricioara Lutărie II (Table A I, 6). Their ranges suggest some chronometric equivalences between the two stations. Some levels, in fact, seem to be coeval — or nearly so — with one another. What this signifies in cultural terms shall only become apparent when the Mitoc assemblage analyses have been completed and then correlated to those at Bistricioara.

It is of interest to note that the early Gravettian Mitoc date just quoted (GX 9418) coincides surprisingly closely with the Bistricioara Lutărie II date of (GrN 10529) 27,350  $\pm$  1300 BP for the Middle Aurignacian level I there. This seems suggestive of contemporaneity of the Aurignacian and Gravettian at the two stations. Whether or not this is in fact so must await careful analysis of the aforementioned associated Mitoc cultural materials and their comparison to those at Bistricioara Lutărie. It is to be pointed out that both these dates are, in turn, not too distant from the Ripiceni Izvor level I Middle Aurignacian date of (Bln 809) 28,420  $\pm$  400 BP.

Finally the above Mitoc date has a special importance in that it is close to dates obtained for early Gravettian levels at some stations in Central Europe<sup>52</sup>, for example:

Dolni Vestonice GrN 1286 25,820  $\pm$  170 BP

Pavlov GrN 1272 26,620  $\pm$  230 BP

Krems-Wachtberg GrN 3011 27,400  $\pm$  300 BP

Radiocarbon dates for the whole course of the Romanian East Gravettian are as yet spotty. Nonetheless, the new chronometric data from the two Moldavian sites Bistricioara Lutărie and Mitoc Malu Galben in Table B III seem to indicate that succession of the Aurignacian by the Gravettian could have taken place by about 27,000 BP (GX 9418 26,700  $\pm$  1040 BP). A terminal absolute date, however, is not yet available. The dates listed in Table B I in the range of from 18,000 to 17,000 BP for Bistricioara Lutărie, Lespezi and Mitoc Malu Galben are associated with what appear to be intermediate and not final Gravettian habitation levels. The data base is also presently insufficient in fixing an exacting chronology of the various evolutionary stages which have been suggested for the Gravettian here<sup>53</sup>. Clearly, more information is desirable. First and foremost, the stone tool typology and technology characterizing assemblages of the various developmental phases of the Gravettian must be described with rigorous modern scientific precision. Only then, it is here proposed, shall the range of radiocarbon dates which have become available on this project become truly culturally relevant. At that point too, serious attempts should be undertaken to determine whether or not Marcel Otte's recently outlined periodization of the Gravettian in Central and East Europe<sup>54</sup>, can also be applied to Romania. The challenges ahead are great indeed!

## EPIPALAEOLITHIC AND MESOLITHIC

A glance at Table B I shows a considerable chronological gap between the latest yet dated Gravettian level at Mitoc Malu Galben (GX 9423 17,300  $\pm$  2100/1670 BP) and the oldest yet dated Epipalaeolithic level at Cuina Turcului Dubova (Bln 803 12,600  $\pm$  120 BP). Chronometrically, this gap is maximally 6,680 and minimally 3,150 years. Since a terminal absolute dating of the East Gravettian has not yet been made, nor a beginning one for the Epipalaeolithic this time gap is not especially bothersome. Future research should resolve the problem. Traditional wisdom otherwise specifies a beginning date for the Epipalaeolithic (and ipso facto end of East Gravettian?) at between 13,000 and 12,000 or even 10,000 years BP<sup>55</sup>.

The Epipalaeolithic and Mesolithic technocomplexes are said to be characterized by a number of regional, ecologically influenced, traditions<sup>56</sup>. The dating reported here for the Northwest Pontic Tardenoisian station of Erbiceni (Table B I, GX 9417 7,850  $\pm$  215 BP) is the first obtained for this complex, widespread in Moldavia and in the regions to the east and northeast.

<sup>52</sup> F. Smith, *op. cit.*, p. 670.

<sup>53</sup> C. S. Nicolăescu-Plopșor et al., *op. cit.*, p. 25–30.

<sup>54</sup> M. Otte, *Le Gravettien en Europe Centrale*, I, Brügge, 1981, p. 133–136.

<sup>55</sup> Al. Păunescu, *op. cit.*, p. 536; V. Dumitrescu, A. Bolomey, Fl. Mogoșanu, p. 46–54.

<sup>56</sup> Al. Păunescu, *op. cit.*, p. 536.



The Mesolithic levels dated at Ostrovul Corbului in Mehedinți County, first published by this writer in 1981, are also the first for that region<sup>57</sup>. The two dates obtained average  $7,860 \pm 237$  BP. Considered together, the two date sets demonstrate the coexistence on the same time level of culturally quite divergent Mesolithic life styles with regionally distinctive imprints.

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The nearly 50 radiocarbon age determinations presented for twelve Middle and Upper Palaeolithic, Epipalaeolithic and Mesolithic stations is the largest series yet obtained for Romania. They cannot, however, serve at the present as absolute time-markers of distinctive archaeological cultural horizons except in a most general fashion. There are a number of sound reasons for this.

A small number of dates are anomalous, some charcoal and bone samples from the same level produce different age results, other times similar ones and provenance questions arise concerning some samples. Some habitation levels are represented by single — unconfirmable — dates while others have several. Above all though, there exists a serious lack of precise definition of the assemblage contents of cultural levels dated, a major drawback for interpretative purposes. Given the imprecise cultural characterization of some archaeological horizons, the limited chronometric data base presented here can only serve as an adjunct in future rigorous definitions of Romanian Palaeolithic technocomplexes and their evolutionary stages<sup>58</sup>.

<sup>57</sup> K. Honea, *AJA*, 35, 1981, p. 485; *idem*, *SCIVA*, 33, 1982, p. 219–220.

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