Geographical and Chronological Patterns in East Central and Southeastern Europe

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Outline

Geographical Setting

The area covered in this chapter comprises the political entities of Czechoslovakia, Lower Austria, Hungary, Romania, Yugoslavia, Bulgaria, and Albania. Geographically it includes the drainages of the upper Elbe, flowing northwestward to the Baltic, the middle and lower Danube system flowing to the Black Sea, those of the Yugoslav and Albanian coasts to the Adriatic, and the Vardar of south Yugoslavia and the Marica (Maritza) of Bulgaria to the Aegean (see fig. 2).

South of Moravia, Lower Austria westward to its general division from Upper Austria in the Enns, Salzach, and Traun tributaries of the Danube (Pittioni 1961; Ehrich 1976) opens via the Vienna Basin to the Hungarian lower lands to the east and to the Little Alföld plain connecting with the lower Moravian Plain to the north.

The Middle Danubian basin includes the entire Danubian drainage from the edge of Upper Austria and the eastern Alps to the Danubian Gorge or Djerdap which separates it from the Lower Danubian drainage. The latter lies mostly between the Transylvanian Alps which form its northern border and the Stara Planina range to the south.

Bohemia, the northwest corner of our area, is diamond shaped, framed on the southwest by the hills of the Bohemian Forest which separate it from the Upper Danube, on the west by the Erzgebirge, on the northeast by the Sudetens, and along the southeast by the Czecho-Moravian Heights. The upper Elbe system provides its

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We herewith express our deepest thanks for many kindnesses and much help from numerous colleagues, not only those who gave generously in conference of their time and knowledge but also those who made available as yet unpublished information, called our attention to published works hitherto unknown to us, and often sent or gave critically needed volumes and offprints.

Many have tried to guide us through the welter of materials, but what we have done with it remains our own responsibility. It is, of course, too much to hope that any specialist in the area will be completely happy with all of our results. However, this chapter may at least help to serve as a general guide for the nonspecialist.

Among those to whom we are particularly indebted are the following, whose countries and names we list alphabetically: *Austria:* The late

only drainage. Its northern part is, for the most part, a loess-covered basin with rolling hills, its southern part a deeply trenched plateau.

East of Bohemia, Moravia, the valley of the southward-flowing Morava, provides a corridor of easy access to the north European plain and separates the Sudeten ranges from the Carpathians. On the north a low watershed separates the headwaters of the Morava from those of the Oder. On the south the Morava joins the Danube, and its lowland connects with the Little Alföld plain as well as Lower Austria.

The northern Carpathian arc not only furnishes the political boundary between Poland and Slovakia, but is a watershed between the north European plain and the Middle Danube. In western Slovakia the broad valleys of the Vah and Hron rivers curve flatly westward to enter the Danube before it bends sharply south at the Danube knee and divides the hilly country of Transdanubia on the west from the Great Hungarian Plain to the east. Eastern Slovakia, on the other hand, is cut by the dendritic pattern of the upper Tisza, which rises in the Ukraine and collects the westward flowing waters of the Someş, Körös (Criş), and Maros (Mureş) from the Transylvanian basin as it runs southward parallel to the Danube before joining it some twenty-five miles above Beograd. The Alföld or Great Hungarian Plain extends eastward from the Danube to the western hills that border Transylvania.

The Carpathian arc encloses the Transylvanian basin on its north and east and returns westward as the Transylvanian Alps, which mark the northern edge of the Lower Danube plain. Irregular massifs loosely plug Transylvania's western side, through which the major rivers all flow west to the Tisza. Only the upper Olt in the southeast penetrates the wall of the Transylvanian Alps, and the Bistrica cuts through the eastern wall to join the Siret. East of the Carpathians the Siret and the Prut wheel southward around the mountains to define the Romanian provinces of Moldavia and the eastern part of Muntenia, which were formerly described as the Romanian portion of Bessarabia.

On the west the eastern Alps mark the edge of the middle Danubian basin. The headwaters of the Sava and the Drava rise here and run eastward to join the Danube, the Drava reaching it above Osijek and the Sava at Beograd. The major tributaries of the Sava join it from the south, and this one system covers approximately one-half of Yugoslavia.

Along the western side of the southern tier the Dinaric Alps and Albanian Mountains isolate the Adriatic drainage from the interior, except for the Drim system, which rises in the Kosovo-Metohija and in eastern Macedonia. From here eastward to the Vardar and Morava valleys the Sava tributaries of the Krka, Bosna, Drina, and lesser streams drain the south part of the Yugoslav basin. The Crna in the southwest traverses the plain of Pelagonia, which opens toward Greek Thessaly, and flows eastward to join the southward-running Vardar below Titov Veles. East of the Vardar and the northward-flowing Yugoslavian Morava, which joins the Danube, the mountains screen off the Struma and Strumica in the south and the Timok to the north of them.

Bulgaria to the east is divided roughly into the southern or right-bank plain of the lower Danube, watered by streams from the Stara Planina to the south, and below the Stara Planina is the Rhodope Massif and the valley of the Marica, which flows to the Aegean (see fig. 2).

In other papers Ehrich (e.g., 1970a, 1970b, 1987) has called attention to the persistences and reappearances of culture areas and culture boundaries within this area and also as a principle in culture history. The role of geographical boundaries, river systems, and interior contact areas is critical to understanding the culture history of the region.

Some Archaeological Considerations

The strong correlations between geographical and cultural patternings (e.g., Ehrich 1970b; Sherrat 1982) may seem deceptively simple, but the actual complexity of synthesizing is often obscured by the fact that the literature is in eight or more languages. Even the same rivers and cultures may have different names in neighboring countries, for example, Körös (Hungarian) and Criş (Romanian), while in English at least two Morava rivers, one in Czechoslovakia (German March) and the other in Yugoslavia, present a possible source of confusion.

Whether or not one agrees with them in detail, several summary works now provide more comprehensive introductions, as do separate studies of particular cultures and periods, as well as relationship patterns discussed in site reports, published symposia, and various articles.

Richard Pittioni and Elizabeth Ruttkay, Vienna; *Bulgaria:* Georgi Il. Georgiev and Rumen Katinčarov, Sofia; *Czechoslovakia:* Miroslav Buchvaldek, Prague; Bohuslav Chropovský, Nitra; Evžen Plesl and Emilie Pleslová-Štiková, Prague; *England:* John Chapman, University of Newcastle on Tyne; *Hungary:* Ida Bognár-Kutzián; Nándor Kalicz; János Makkay, Pál Patay, and Pál Raczky, all of Budapest; *Romania:* Eugen Comşa; Vladimir Dumitrescu; Silvia Marinescu-Bîlcu; Petre Roman; Alexander Vulpe, Bucharest; and the late Nicolae Vlassa, Cluj; *Yugoslavia:* Aloyz Benac, Sarajevo; Draga and Milutin Garašanin, Beograd; Jovan Glišić, Priština; Borislav Jovanović and Nikola Tasić, Beograd.

In the United States we are deeply grateful to Homer L. Thomas for his constant assistance and for sharing his wealth of information, to Bela Maday for a translation from the Hungarian, and to Nancy Lambert Brown for putting the synchronic chart into respectable form.

We also express our appreciation to Norman Hammond who, when in the United States, made available to us copies of the advance proofs of the pertinent sections of the second edition of the *Cambridge Ancient History.*

Despite their fundamental imprecision, the increasing numbers of radiocarbon determinations help bring the picture into better focus, although unevenness in the degree of excavation, publication, the number of determinations available, variations between the results from different laboratories and in the reliability of the samples lead to some discrepancies and lacunae in the overall coverages. Since the literature for this area contains many charts giving relative chronologies of greater or lesser scope, we emphasize what seem to be acceptable equations, using key calibrated radiocarbon dates, averaged and usually with ranges, as reference points and controls. (For individual dates see tables 1–7.)

In this chapter we concentrate on cultural sequences, distributions, radiocarbon determinations, and on bibliography in which many items provide extensive further references.

The writers are thoroughly aware that pottery groups by themselves do not constitute separate cultures. However, ceramic inventories do express complex patterns of learned behavior, and close similarities between pottery groups or wares usually indicate peoples who are in actual contact with each other or who have a shared cultural heritage. As in almost any classification, the greater the number and intensity of similarities, the greater is the degree of presumed relationship (e.g., Ehrich 1950, 1965a:3–4). In Europe many cultures are customarily described by reference to their ceramics, for example, *Bandkeramik* or Linear, Stroked Ware, Corded Ware, Bell Beaker people, and so forth. When we use these terms, we refer to peoples with such pottery and to their cultures.

Some Geographical Archaeological Applications

In Bulgaria, the central area along the Danube is no longer considered a potentially distinct north-central region. The division now seems to be simple northwest or western, with essentially western or west-related complexes, southeastern with a dominating role by the Marica (Maritsa) and Tundža (Tundzha) rivers of the Thracian plain, and northeastern with varying relationships to the Romanian and steppe spheres to the north and east and with others to the south.

As the first major site in which stratification was well established (Georgiev 1961), the mound of Karanovo with its successive levels has served as the key to interpreting both the Marica drainage and the relatively level nearby Thracian plain. Several other sites, such as Yassatepe (Jasatepe) and Kapitan Dimitrejovo, have been fitted into the Karanovo sequence. Georgiev's (1961:49) numbering of the strata as reported in the 1965 edition is now universally accepted.

Strata at the site of Čavdar at the northern edge of the Sofia basin, and at some other sites, not only confirm the Karanovo stratigraphy but have also produced radiocarbon dates that have a wide application. We incorporate the individual phases of the Karanovo sequence in our discussions of the various chronological equations.

For Romania, since the Körös and Maros drain most of Transylvania westward, cultures of the earlier periods moved upstream from the west, and southeastern Transylvania mostly reflects the impact of Muntenia on the upper Olt. Eastern, and later northern, Transylvania shows strong influence from beyond the Prut, that is, the Dniester-Bug area, via Soviet Moldavia and ultimately from Romanian Moldavia. Along the Danube Valley south of the mountains, cultures from the west traversed Oltenia to the Olt, which forms the boundary between Oltenia and Muntenia. Cultural development in these two provinces differed from each other.

To the west the Yugoslav Adriatic drainage serves as part of the littoral culture area, the cultures of which are generally distinct from those of the plateaus east of the ranges (Ehrich 1970a, 1970b). Only the Drim system of Albania provides any ingress for coastal culture elements to penetrate as far as the Kosovo-Metohija area in which cultures moving eastward along the Drim and northward along the Vardar systems, and Danubian elements moving southward by the Ibar and Sitnica tributaries of the Western Morava, met and to some extent mingled (J. Glišić, pers. information).

For the chronological equations that follow, the data are uneven with regard to geographic coverage, cultures, and periods.

The total procedure is, of course, one of building up a series of relative chronologies and then checking their validity through the medium of calibrated radiocarbon dates, both within our general area and beyond its geographical limits by reference to related cultures. Since radiocarbon coverage is spotty and since some determinations are unreliable because of faulty attribution, contamination, inconsistencies between laboratories, irregularities in the process, and the like, the best one can hope for is to anchor the various networks of relationships roughly in time by establishing, to some degree at least, some acceptable reference points.

In this context, the calibrating of the radiocarbon determinations to adjust them to the dendrochronological time scale has been of inestimable value in standardizing and establishing comparable results. For the most part we have been able to use the reported 5568 half-life b.p. dates when calibrating, but in those instances in which only B.C. dates are given, we have converted them back to what must have been their original b.p. determinations, and where the standard deviations are not given we have assumed a ± of 100.

For our tables of calibrated averaged dates in the text we have used the following formula: arithmetical average of the reported dates b.p. ± the average 1σ divided by the square root of the number of dates averaged. We have then used the resulting b.p. date for entry into the calibration tables given in the appendix (see also "Concerning the Radiocarbon Dates" in the introduction to this volume). In this process we have made use of those dates for which the combined sigmas are approximately equal to or larger than the differences between the b.p. dates averaged or in a stepped series between the pairs within them, and we have eliminated those dates that are obviously out of range. We give the individual dates for our area in tables 1–7. Dates from outside our area are as noted.

In constructing our series of temporal equations we have to a great extent eliminated discussion of specific intrasite and intersite relationships which are either treated in some detail in the sources cited or in the items referred to in their bibliographies. We have used only such cultural traits as the Danilo-Kakanj cult vessels and the much later graphite-ornamented Karanovo VI–Gumelniţa–Early Sălcuţa–Krivodol–Bubanj I pottery to establish specific chronological and geographic relationships. In general the three deeply stratified sites of Karanovo, Vinča, and Obre stand out as landmarks.

Although we are dealing with chronological horizons, we avoid this term in favor of *temporal equations* in order to avoid confusion with the summary maps for which Homer Thomas uses *horizons* to denote more general equivalencies and a greater order of exactitude. In the interests of brevity we have selected only a very few sites or strata by which to label each temporal equation, although many others of equal importance are included in the equations themselves.

Since the following general comments span more than one temporal equation, it seems better to include them at this point rather than to try to do so piecemeal under the separate discussions.

There seems to be general agreement that the older pattern of existing cultures was gradually disrupted by incursions of nomadic and seminomadic peoples, originally from the steppes to the east, who moved westward for the most part by stages. Gimbutas for some years (e.g., 1980a:1, 1982:18) has identified the original groupings, our equations I–V, as Old Europe, with the eastern influxes beginning in our equation V. She has divided these last into three general Kurgan Waves which she labels Kurgan I 4400–4200 B.C., Kurgan II 3400–3200, and Kurgan III 3000–2800. She interprets these waves as probably more or less signifying movements of Indo-European-speaking peoples who gradually came to dominate the European scene. She envisions a survival of existing cultural elements with an overwash of and integration of the new cultural patterns with those of the old, with varying degrees of admixture in the amalgam. Her formulation has by no means met with universal or complete acceptance. (For other views see, e.g., Anthony 1986; Thomas 1982; Ecsedy 1979:55, 56.)

In this regard Kalicz (1980:247, also fig.2, p. 248, and fig.3, p. 259) stresses that between the Balaton and Balaton-Lasinja cultures there are marked differences in culture content and in affiliations with contemporary groups, the patternings of which show marked differences throughout the area. He attributes this change to "a chain reaction instigated by a wave of Kurgan movement" (p. 267). The major impact of the eastern steppe peoples appears in the cultures of temporal equations V, VI, and VII.

Temporal Equations

Temporal Equation I (Earliest Period)

Gura Baciului–Anzabegovo I–Karanovo I–Thessalian Early Neolithic II or Proto-Sesklo Horizon, and a suggested revision of the Thessalian Early Neolithic terminology

As of 1965, with the possible exception of Karanovo I, the Starčevo culture horizon with Karanovo II and Starčevo-related cultures appeared to be the earliest Neolithic in southeastern Europe. However, since then, evidence of an earlier occupation has appeared. Between its distinctive pottery and the wares of later Starčevo levels at various sites there seems to be no relationship. Thus the continuity suggested by calling this culture either Pre- or Proto-Starčevo is misleading, and we therefore refer to it as the Gura Baciului–Anzabegovo I–Karanovo I horizon. To this belongs the bottom layer at Veluška Tumba (Simoska and Sanev 1975), formerly called Pelagonian and thought to be later Neolithic, Anzabegovo I (Gimbutas 1976 and M. Garašanin [pers. information]), Vršnik I (Garašanin and Garašanin 1961), Cîrcea I near Craiova on the Jiu River in Wallachia (Nica 1977), Gura Baciului near Cluj in western Transylvania on the Little Someş drainage (Vlassa 1972), Donja Branjevina at Odžaci in the Yugoslav Bačka (Karmanski 1968, 1975), and Gălăbnik in the upper Struma (Pavúk and Čochadžiev 1984). Recently I. Paul has been excavating a settlement of this period at Ocna Sibiului (Triguri) in the upper Olt drainage of southeastern Transylvania. Although Dumitrescu (1983a) mentions three strata there, it is unclear whether all three belong to this period or represent a succession. No further information is currently available (pers. comm. from M. Garašanin, E. Comşa, and A. Vulpe).

Generally the levels of this period occur independently. Only at Donja Branjevina does the excavator claim that the pottery appeared in association with Starčevo material, particularly the so-called altars. Although some

skepticism has been voiced as to the manner of excavation, it also seems quite possible that this admixture may have resulted from a disturbance of the earlier level and a backfill during subsequent Starčevo, or even later, times. The five sherds painted in this style from Szarvas 23 (Makkay 1981) may well have a similar history of contamination.

The distinctive pottery clearly links some of these sites and relates them to Proto-Sesklo of Thessaly (e.g., M. Garašanin 1982c). Since Veluška Tumba on the Pelagonian plain is in the Crna drainage, which is a component of the Vardar system but with the plain also opening toward Thessaly and eastern Macedonia, and since Anzabegovo lies near the end of the Ovče Polje which bypasses the Iron Gate or Gorge of the Vardar, such a southern origin, also possibly working northward in west Bulgaria, would seem reasonable.

The generally accepted recognition of this early period renders obsolete the currently popular trend toward seeing a local transformation from the Mesolithic to the Neolithic in the Iron Gates of the Danube from the Epipaleolithic or Mesolithic from Schela Cladovei to what is clearly the Starčevo period (see also Dumitrescu 1983a). Also a direct transition from Mesolithic to Neolithic in Tier III to the north in east-central Europe, where the Linear ceramic group is still later, that is, Late Neolithic in our southern equation but still the earliest Neolithic in Tier III (Ehrich 1990) and western Europe is beyond belief.

Thus Starčevo-Körös-Criş and Karanovo II and III become Middle Neolithic. The somewhat later incised *Bandkeramik* I of north and northwest Hungary, west Slovakia, Austria, Moravia, Bohemia, and West Germany as well as Poland would become Late Neolithic, as do Karanovo IV and Vinča A and B (Vinča-Tordos). Other cultures throughout the area are also similarly elevated on the terminological scale.

One must remember, however, that these broad classificatory terms have been for convenience only in the construction of general sequences and equations in large areas, so that one might incorporate much more specific groups and relationships as outlined below. They have no intrinsic meaning of their own. The examples given merely identify the major patterns of the broader framework.

Now, although the *Bandkeramik* or Linear wares represent the oldest Neolithic population in central Europe, where they are still called Early Neolithic, they equate with the Vinča-Tordos or Late Neolithic farther south. For this reason we abandon the Early, Middle, and Late Neolithic designations and formulate our discussion in terms of temporal equations, relapsing only with regard to specifically local or regional sequences.

At Anzabegovo and at Gălăbnik I strata of the Gura Baciului–Anzabegovo I–Karanovo I–Thessalian Early Neolithic II "Proto-Sesklo" horizon underlie levels of the Starčevo and Karanovo II Neolithic complexes. A brief summary of key calibrated radiocarbon dates follows.

Ten radiocarbon dates reported from Anzabegovo Ia and Ib overlap and fall so closely together that we can treat them as from a single stratum. These include two dates that are lower than expected but exclude two others for which the reported dates fall above the range of the calibration tables, and a third within the range but that could be from either Stratum I or II.

Three dates from the early Neolithic at Veluška Tumba fall within a very narrow range, with a very similar one from the nearby site of Tumba.

In Bulgaria a series of nine dates at Čavdar is assigned to the Karanovo I period, while fourteen from Azmak and two from the hospital at Stara Zagora, while partly within the same range, may average slightly later. (For the Čavdar report equating Čavdar I–III with Karanovo I–III see Georgiev 1981:107–8.)

Site	*No. of Dates*	*Range* B.C.	*Average* B.C.
Anzabegovo I	9	6400/5715–5550/5250	6075–5555
Veluška Tumba	3	6025/5500–5965/5470	5960–5485
Tumba	1		5810–5395
Čavdar	9	6330/5730–6000/5485	6125–5590
Azmak	14	6300/5640–5325/5065	5760–5390
Stara Zagora	2	6425/5665 and 5915/5460	

We thus have some anchor dates to which we can relate other sites and strata of this horizon as, for example, Odmut (see below).

Furthermore, since the assemblages from Gura Baciului, Anzabegovo I, and Karanovo I equate with the so-called Proto-Sesklo of Thessaly, it seems appropriate at this time to try to resolve a matter of very considerable confusion. Starting with an early and a late phase of Sesklo, as initially designated at Otzaki Magula, Milojčić subsequently determined a third phase falling between them, which he labeled Pre-Sesklo (*Vorsesklo*). Still later at Argissa a fourth phase appeared falling between Early Sesklo and Pre-Sesklo, which he inserted as Proto-Sesklo (e.g., Milojčić 1959).

Although this sequence is now semisacrosanct by usage, John Coleman, Marija Gimbutas, and Homer Thomas join us in recommending the following substitutions in terminology in order to make sense out of this semantic monstrosity:

> A change from Late Sesklo to Thessalian Middle Neolithic; a change from Pre-Sesklo to Thessalian Early Neolithic 3; a change from Proto-Sesklo to Thessalian Early Neolithic 2; and a change from Early Sesklo to Thessalian Early Neolithic 1.

Any new subdivisions requiring insertion into this scheme can be incorporated by adding subordinate letters to these numbered phases.

Temporal Equation II

Starčevo-Körös-Criş–Karanovo II–III–Thessalian Early Neolithic 3 (Pre-Sesklo)

During this period some geographic regionalization appears, although Neolithic sites still do not occur in the northern part of our area.

The Starčevo-Körös-Criş complex is essentially Middle Danubian, with some penetration to the east. The Starčevo group in the south is characterized by a much higher proportion of painted wares, while in the Körös (Hungarian) and Criş (Romanian) assemblages painted pottery of this period is relatively rare. Much, although not all, of the other pottery is virtually indistinguishable. According to Kosse (1979) in Hungary at least, the Körös people depended more on sheep and goats and wild game whereas the Starčevo people relied more heavily on cattle. Although this last seems a difference based on local adaptations to microenvironments, the ceramic inventories do seem to reflect two large regional branches of a single major culture (see also Dumitrescu 1983a).

With regard to the Körös-Criş complex Dumitrescu (1982:27, pers. comm. in 1984) thinks that although Starčevo and Criş are often mentioned as two related cultures, they actually form a single one with varying elements. In a general broad level of classification he is undoubtedly correct, although those who prefer to see distinctions can justifiably argue that they constitute major regional variants. On his map 2 (1982:18–19) Dumitrescu shows its distribution eastward through Transylvania except for the northern part, its mountains, and southern Moldavia, Muntenia, and the Dobrudja, which constitute the southeastern fringe below the mountain wall.

Geographically the heart of the Starčevo culture would seem to be in the Banat-Bačka plains north of the Danube. Southward it extends up the Morava to its watershed with the Vardar and down the Vardar at least to the Ovče Polje and the Svetoniskolska River at Anzabegovo, Vršnik near Turini and Rug Bair in Macedonia (Gimbutas 1976; Garašanin and Garašanin 1961; Galović 1964). Westward a few sites, including Gornja Tuzla, suggest a rather thin population or lack of exploration of the southern Sava drainage, with its westernmost manifestation appearing in the two bottom layers at Obre I (Benac 1973a, 1979; Gimbutas 1974a) in the Bosna Valley, where it seems to be peripheral and impoverished. There is no current evidence that it extended over the watershed of the Dinaric Alps to the Adriatic drainage, which seems to have belonged to a littoral culture area (Ehrich 1970b).

To the north it seems to extend up the Tisza as far as the Körös junction, and westward along the southern part of the Danube-Tisza plain (Makkay 1982: maps 1–3; Kalicz and Makkay 1977) to southern Pannonia where some eleven sites are now known in the Drava drainage between Lake Balaton and the Drava, a not surprising route of penetration. (N. Kalicz reported three of these sites in a paper read at the IUPPS Congress at Nice in 1976; also further personal information from him and from J. Makkay.)

Starčevo wares have also appeared between the Sava and Drava rivers at Vinkovci (Dimitrijević 1969b, 1979b) and Sarvaš (Schmidt 1945) as well as at other sites near the boundary between Syrmia and Slavonia.

Eastward the Starčevo variant extends beyond the Danube Gorge along the north lower Danubian plain (Dumitrescu 1982: map 2, pp. 18, 19), and some occurrences are reported to the south of it in northwest Bulgaria on the upper Struma. East of the Timok, the closely related complex found at Kremikovci (Georgiev 1975) and variants at Gradeschnitza (Nikolov 1974) occur eastward to the Sofia basin, and in caves along the northern slopes of the Stara Planina (M. Garašanin 1982; map 6, on p. 76; G. I. Georgiev, pers. information).

On the Adriatic coast the earliest Impresso Wares may begin during this period, although for the most part they seem to equate with early Vinča (Batović 1979). Since the stratifications at Anzabegovo (Gimbutas 1976) and Vršnik (Garašanin and Garašanin 1961) confirm each other quite well, Ehrich (1954, 1965c) still knows of no justification for describing a Starčevo I phase as being without painted pottery (see Arandjelović-Garašanin 1954; M. Garašanin 1982c). Since there are unquestionably two levels assignable to the Starčevo horizon at both sites (Garašanin 1982c; Gimbutas 1976), and since Horizon I at Gălăbnik is already late Starčevo while some Starčevo elements seem to appear in Horizon II, suggesting an equation with Anzabegovo-Vršnik II (Pavúk and Čochadžiev 1984), one can distinguish two major phases, and probably two subphases for each. For his periodization Garašanin follows that of Arandjelović-Garašanin as preferable to others (e.g., Dimitrijević). However, this scheme was erected on the basis of some misconceptions with regard to the type site of Starčevo itself (Ehrich 1977; Ehrich and Garašanin, final report in prep.), and there seems little justification for applying it across the board.

Starčevo levels occur at stratified sites appearing as Anzabegovo II and III, Vršnik II and III, Gălăbnik, probably II and certainly III, and at the bottom of Vinča as Ia, Obre I, levels I and III, and Gornja Tuzla and also as

equated at Karanovo II and III. In addition to radiocarbon dates from Yugoslavia and Bulgaria there are a few Körös dates from Endröd, Szarvas, and Méhtelek in Hungary, and a few Criş determinations from Romania.

Despite a growing acceptance of the settlement at Lepenski Vir as Neolithic (e.g., M. Garašanin 1979, 1983; Jovanović 1969, 1971, 1974, 1984), since the excavator's initial erroneous ascription of it to the Mesolithic period is still being perpetuated by some (e.g., Srejović 1978, 1979: chart, p. 36; Evans and Rasson 1984) and is also being used to document an absolutely nonexistent (see Dumitrescu 1983a) cultural transformation within the Danube Gorge (also rejected by M. Garašanin 1978), a few comments are necessary.

1. The highly distinctive, complex, and close architectural similarities between the settlements at Padina, which is demonstrably of Starčevo Neolithic character (Jovanović 1969, 1971, 1974, 1984, and pers. comm.), and Lepenski Vir argue strongly for their contemporaneity.

2. The paucity of domestic animal remains (Clason 1980) is of no significance, for the terrain would support neither foraging, the growing of fodder, nor the growing of crops. Such livestock as do appear must have been driven in and then slaughtered or butchered outside the immediate area and the parts carried in.

3. As originally described by Jovanović (1969:31–32), although Mesolithic graves were found underneath and around the houses at Padina, there is no evidence that associates them with the settlement, and they seem earlier. Živanović (1976:518) describes the skeletons as being of Cro-Magnon type, which is also characteristic of the Mesolithic. Jovanović (1969:32) refers to a Europoid Mesolithic type followed by a more Mediterranean Neolithic one in the area, the elements of which are mentioned by Živanović.

4. Three radiocarbon dates from graves ascribed to the oldest Padina Mesolithic when calibrated average 5592 ± 60 B.C. (Jovanović 1969:32; Živanović 1976). One as Middle Mesolithic is calibrated as 5800–5390 B.C., and a third, purportedly from the youngest Mesolithic, as 4735–4555 B.C. seems clearly too young and is probably aberrant. The dates of the others fall within the Starčevo range and may or may not be reliable.

From the houses at Padina three dates, one from each of the three Starčevo phases B1, B2, and B3, fall so closely together that the presumption that the different terraces represent separate occupations seems less likely than that they were contemporary; a fourth date from B3, the so-called oldest, is far too young (Jovanović 1984:163).

The ascription of Lepenski Vir to the Mesolithic thus is without cultural or chronological foundation. The averages of the three apparently reliable dates from Padina and the three from Lepenski Vir fall close together and overlap and conform well with Anzabegovo I and also II or early Starčevo, while the other Starčevo period dates equate with Anzabegovo III and Starčevo itself as late Starčevo. Interestingly, the three dates from Vlasac that fall within the range of the calibration tables lie within the range of Starčevo period dates, whereas the two outside this range fall five hundred to six hundred years earlier (see table 7).

A basic list of averaged calibrated B.C. dates for this period is as follows:

Site and Level	*Dates*	*Range* B.C.	*Average* B.C.
YUGOSLAVIA			
Anzabegovo II	8	6185/6515–5875/5400	5995–5550
Anzabegovo III	4	5745/5365–5565/5260	5605–5305
Obre I and II	2	5865/5395–5740/5380	5785–5400
Starčevo	10	5970/5490–5515/5250	5705–5365
(Essentially late Starčevo. From bone collagen. Excludes an aberrant experimental date from pottery.)			
Padina settlement phases B1–3	3	6210/5615–6140/5580	6170–5610
Lepenski Vir	3	6060/5515–5845/5430	5950–5475
HUNGARY (Körös)			
Endröd, Méhtelek (combined)	8	5695/5435–5515/5220	5715–5370
BULGARIA (Karanovo II/III period)			
Stara Zagora	9	5970/5490–5575/5240	5735–5380

Temporal Equation III

Vinča–Karanovo IV–Linear Incised Ware (Bandkeramik)

Marked regionalization and diversity appear during this period. Our three major reference points are the two deeply stratified sites of Vinča on the middle Danube and Karanovo in the Marica-Tundža drainage. The third consists of the more or less unstratified flatland occupation sites of the Linear Incised or *Bandkeramik* wares in northeast Hungary, across Slovakia to lower Austria, Moravia, Bohemia, and other areas to the north and west (e.g., see this vol., Bogucki, chap. 20; Wells, chap. 19; and Thomas and R. Rowlett, chap. 17).

Since the excavations at Vinča took place before the advent of radiocarbon dating (e.g., Vasić 1932–36; Filip et al. 1969:1589) and at Karanovo (Georgiev 1961; Filip et al. 1969:577) before it could be put to practical use, the rough equations derived from them have rested on relative data. Further, because of some confusion in the reliability of its interpretation, much of the Vinča sequence was at least partly unraveled by reference to styles and to other sites. As of this writing a control excavation at Vinča is under way. The floating chronology thus arrived at, as in other areas, has been the subject of contro-

versy between those favoring a high chronology and those supporting a low one. Throughout Europe and the Middle East the new calibrated radiocarbon evidence generally favors the high chronology.

The Vinča Complex

Vinča lies on the right bank of the Danube across from Starčevo, some 11 km downstream from Beograd. Since the material from the excavations of Vasić between 1908 and 1932 was reported by depth rather than by stratum, considerable confusion resulted. Childe (1929) recognized an early and a late period in the Vinča Neolithic-Eneolithic sequence, and in 1939 Holste proposed a four-part periodization from A to D. This is still fundamental despite the addition of subphases, and despite M. Garašanin's more recent subsuming of Vinča A-B1 as Vinča-Tordos (Turdaş) and B2-D generally as Vinča-Pločnik (e.g., Garašanin 1982c:118), in some sense reverting to Childe's Vinča I and Vinča II (see also Garašanin 1979; synchronic chart, p. 212.)

The origins of this culture are far from clear. One school sees it primarily as the result of diffusion from Anatolia (e.g., M. Garašanin 1979, 1982c as the leading exponent of this traditional view), while others (e.g., Chapman 1981; Markotić 1984) give much greater weight to local development and internal spread. (For a discussion of these differing points of view see Chapman 1981:1–5.) Some characteristic Vinča elements do appear at Starčevo, while at Vinča Starčevo pits underlie the Vinča deposits, and some Starčevo elements seem to survive into Vinča A.

Both Chapman and Garašanin stress regional differences, with Chapman particularly seeing variation in rates of ceramic change.

Based on uncalibrated B.C. dates eked out by some relative data such as imports, Chapman (1981:18) arrives at a series of general dates for the separate periods by rough brackets for Vinča itself. When calibrated at 1σ CRD B.C., these are:

Vinča A 5275/5040—5265–5010
Vinča B 5275/5010—5195–4920
Vinča C 5195/4720—4950–4560
Vinča D 4950/4560—4135–3895

Thus, although traditionally the four periods were considered to be of roughly equal length, Vinča D now appears to be much longer than any of the other three.

Against this scale Gomolova Ia (5095–4690), representing the Vinča-Tordos (B1/B2) transition to Vinča C or early Pločnik, falls into place and Gomolova Ib (4575–4520) fits comfortably into Vinča D. However, although Babska Ib ceramically seems Vinča C, its radiocarbon dates fall in the Vinča D range in Šumadija, as is also true of Gornja Tuzla VI. Other equations (Dimitrejević 1979b:268; Chapman 1981:20) are as follows:

Sopot-Lengyel Ib = Vinča B
Sopot-Lengyel II = Vinča C
Sopot-Lengyel III = Vinča D

Gimbutas and Garašanin both describe Anzabegovo IV as early Vinča, and three dates from that level fall clearly together (Gimbutas 1976:29, 30), yielding a range of 5255/4730–5280/5025 with a CRD 1σ average of 5240–4925. This could indicate a date of either Vinča B or C, although it is generally considered as B2. Chapman follows Gimbutas in considering it Vinča B, and Markotić also shows it as such on his map (1984:pl. 72). Since most discussions seem to bracket Vinča A with B1, and Vinča B2 with C, Markotić (1984:14) suggests combining them into two phases of approximately equal length, with durations of 340 and 310 years respectively, while phase D would be approximately 550 years long.

However, in this instance available radiocarbon dates, when calibrated and averaged, add some degree of confusion. In the following list four miscellaneous dates classed as Vinča are so close and intertwined with seven others from Hungary, variously described as early Vinča, Körös-Vinča, and Vinča A, that we have combined them in a single series. The total ranges seem to be within acceptable limits.

On the other hand, the determinations identified as Vinča B fall within the Vinča A range or very slightly later, as do the three dates ascribed to Vinča C. Whether these anomalies reflect inadequacies or errors in sampling, identification, or other factors will have to await further research and additional dates.

The seven determinations for Vinča D from Yugoslavia do follow the earlier ones but are not as low as one would expect, suggesting that they may belong to the earlier part of the period. The two dates from Hungary are considerably later and may indicate a total duration of perhaps eight hundred years for Vinča D.

For the series the major cultural break is between Vinča C and Vinča D.

Dates Classed as	*No.*	*Range* B.C.	*Average* B.C.
Vinča A	11	5405/5195–5210/4895	5315–5090
Vinča B	6	5635/5180–5210/4895	5235–4955
Vinča C	3	5280/4985–5055/4710	5200–4915
Vinča D	7	5220/4695–4590/4430	4950–4705
Vinča D	2	4347/3870 (Hungary)	4160–3885

Geographically the distribution of the Vinča culture conforms well with that of Starčevo, although with some exceptions. Chapman (1981:fig. 63) shows his early "A

+ B" sites mainly concentrated along the Tisza to the lower and middle Maros (Mureş), along the Danube east to Ostrovul Golu, and west along the Sava to Vinkovci, southward up the Morava to Drenovac with outliers on the upper Morava and the Vardar drainage at Anzabegovo and Zelenikovo. Markotić (1984:pl. 72) somewhat less equivocally shows Vinča A sites only along the Tisza, with three "A + B" on the upper Mureş, again with a few on the Danube and no Phase A but a few Phase B sites along the Morava. Between the Drina and the lower Bosna, there are only late Vinča sites, mostly D but with some C. Markotić (p. 197) thus thinks that the Vinča culture originated in the Mureş area, where the earliest settlements seem to exist, and then spread west and southwest into the Banat, Syrmia and Slovenia, eastern Croatia and northern Bosnia, and parts of Montenegro, southward into Serbia and ultimately into Greece, where he identifies the Larissa culture with Vinča D, and eastward into western Bulgaria, Oltenia, and Muntenia. Although both he and Chapman reject Garašanin's "Balkano-Anatolian hypothesis," Chapman more cautiously seems to admit a greater number of links but not general origins.

For Romania Dumitrescu (pers. comm. 1984) considers his 1983 contribution as reflecting his more recent thinking when compared to his 1982 article. Most of the basic data are the same and both are useful summaries. Generally sites of the Starčevo-Criş culture occur throughout the country except for Muntenia and the southern part of Moldavia. After that the cultural unity breaks up and the patterning becomes much more complex for both the Neolithic and the Eneolithic (see Dumitrescu 1983a: map, pp. 80–81).

In Moldavia to the east of the Carpathians the Criş people seem to have persisted until the advent of those with Linear pottery, who came around the mountains. In Transylvania Vinča-Turdaş does not appear east or north of the Mureş (Maros), and for the rest, with very few exceptions, immediate successors seem to be generally lacking.

In discussing Transylvania, Vlassa (1963) reminds us that the Turdaş material on which the Vinča-Turdaş association is based was unstratified and thus that any phasing from the site is based on typology alone. Since erosion has rendered a control study impossible, he conducted excavations at Tărtăria on the middle Mureş. Here he describes the lower part of the thin oldest layer as Turdaş, probably Vinča A, and its upper part as equating with Vinča B, Tisza 1, and east Slovakian Linear. The next two levels he labels Turdaş-Petreşti and Petreşti-Turdaş, reflecting the differing prevalence of their elements. Petreşti seems largely a local development. He describes the latest level as earliest Coţofeni.

The questions concerning the disputed provenience of the Tărtăria tablets are still not settled, but they are no longer considered to reflect the Mesopotamian Protoliterate. Although some still think the pit in which they were found was Coţofeni in date, the current trend is to accept it as from the Turdaş layers and to consider the tablets as belonging with the corpus of pottery marks of that period (e.g., Makkay 1976b; Winn 1981). A second unequivocal find of such material is necessary to resolve the issue. Formerly the tablets were thought to be key elements in establishing chronological relationships, but they have lost much of their importance in this regard.

Along the north bank of the Danube below the Transylvanian Alps and east of the Romanian Banat, where it is at home, Vinča-Turdaş penetrates as far as the Jiu, beyond which lies the derivative Vădastra complex reaching to the Olt River, the division between Oltenia and Muntenia.

On his maps of the four Boian phases (Comşa 1974:31, fig. 9, Bolintineanu phase; 33, fig. 10, Giuleşti phase; 38, fig. 11, Vidra phase; 42, fig. 12, Transitional phase) Comşa shows the earliest settlements beginning in central Muntenia on the Argeş-Dîmboviţa drainage and scattered to the east as far as the Buzau. In the subsequent Giuleşti phase the settlements are much more thickly distributed in this area and are also clustered in the southeast corner of Transylvania, reaching across the southern edge of Moldavia. In the third or Vidra phase there are again fewer sites, mainly concentrated in the lower Argeş and Dîmboviţa area which generally seems to be the nexus for this culture, but with a thin scattering south of the Danube in northeast Bulgaria. His fourth map continues much the same distribution north of the Danube with a separated group to the east along the Black Sea coast and numerous sites in northeast Bulgaria south of the Danube in the upper Tantra, Beli Lonu and Kamčin drainages, and reaching southward into the Tundža River system. Since this last phase is transitional to Gumelniţa, it equates with Karanovo V, now usually designated as the Marica (Maritsa, Maritza) culture and considered by Todorova to be early and middle Eneolithic (Todorova 1978: maps 7 and 8, table 33).

For her late Neolithic (map 6) Todorova equates Vinča A2 with Linear III, and for her early Eneolithic (map 7) Vinča B with Petreşti, Vidra (Boian III), Linear and early Marica, and Pre-Cucuteni I, II-Tripolye A1. For relative chronological equations within Bulgaria see her table 1, and for wider correlations her table 33.

Although she bases the periods of her synchronization tables 1 and 3 on radiocarbon dates, calibrated according to the Suess system, she does not use individual determinations and one must utilize specific dates from other sources in order to confirm or invalidate her equations. In this regard her generalized maps by period also give rough synchronizations. The reader should be warned

that certain misspellings on her table 33 could lead to confusion.

Westward from the area of its major concentration, known sites of the Vinča culture thin out (Markotić 1984: pl. 72), with the Korenovo group appearing in the west Syrmian–east Slavonian area. Dimitrijević (1979b: 312, 360) equates Korenovo with classic Linear II and III, but as not necessarily earlier than Želiezovce, and with Vinča B1. Generally Vinča A and B sites do not seem to extend farther west and south in any strength to the lower Bosna, where Vinča C and D sites are represented.

Except for the upper reaches of the Drava and Sava systems, late Vinča appears throughout Syrmia and parts of Slavonia with sites clustering in the open lands of the lower Bosna. Of twelve sites plotted on his map (1981:421, and identification table p. 493), Chapman identifies only one as early Vinča.

Obre, the Middle Bosna, and the Adriatic Drainage

Ehrich (1970a, 1970b) has pointed out the role of the Dinaric Alps in providing a marked but not impermeable barrier that generally separates the coastal lands of the Adriatic on the west from the mountainous plateaus and basins to the east of them. Cultural penetration seems to have been largely by way of the Neretva, with elements moving from west to east.

For the Adriatic slope and shore, Batović (1966, 1979) indicates a clear sequence beginning with Impresso-Cardial wares followed in turn by the Danilo and Hvar/Lisičići phases, all of which belong with a littoral culture subarea of the north Mediterranean sphere.

On the middle Bosna south of the gorges that close off the lower plain which is dotted with late Vinča sites is a totally different series of archaeological culture groups. For these the two stratified sites of Obre I and Obre II, excavated jointly by Yugoslav and United States teams, together provide a sequence of eight levels with some clear relationships not only with the coast but also more or less indirectly with Italy to the west and eastward as well.

A series of radiocarbon dates (Gimbutas 1974a:16) establishes the Obre sites as an anchor point with wide implications (for which see Benac 1973a, 1973b, 1979).

Since the authors differ somewhat in terminology and interpretation, it seems best to start with the four levels of each site from the discussion of the Yugoslavian team's more extensive excavations.

Obre Site I, levels I and II, consists of two major components: a primarily inland one of Starčevo (so-called Starčevo III) and a strong Impresso-Cardial one from the Adriatic coast. Site I, level III can be described as early Kakanj in which Starčevo painted ware and Impresso wares disappear, barbotine ware continues, and rhytons replace the characteristic Starčevo "altars." Rhytons, often described as cult vessels, are of coastal Danilo type. Obre I, level IV can be designated as Kakanj II, or developed Kakanj, in which barbotine ware disappears, as do Danilo-type rhytons.

Significant for the purpose of comparative dating, only the cult vessels of level III relate to the Danilo culture, and it is this type only that was discussed as Middle Neolithic in relation to the Elateia bothros by Weinberg in the 1965 edition. The bothros is now considered by some to be Late Neolithic or Sesklo III, as in Coleman's chapter in this volume, or terminologically perhaps more consistently as Thessalian Middle Neolithic as we propose in this chapter under temporal equation I. In any event it is only the Obre I, level III and Danilo cult vessels that seem to have spread southward and eastward and are also apparently of the type cited by Bray (1966) as appearing in the Peloponessos. The rhytons of Obre I, level IV are a Bosna Valley Kakanj development and do not seem to have been diffused.

Obre Site II, level I contains some Butmir elements which appear with those of Kakanj, Danilo, Lengyel-Pannonian, and other components with two late rhyton legs and late Kakanj hollow legs like those from the younger Kakanj at Arnautovići. In a Danilo group of eleven painted sherds, four are of Italian Ripoli type, while the spiral decoration on others is characteristically Danilo/Smilčić.

Although Benac considers this layer to be transitional to Butmir, Sterud and Sterud (1974) see a sharp break between level I as Kakanj and level II as the earliest in the Butmir sequence.

Obre II, level II represents a complete break with the Kakanj complex, and there is no evidence of Danilo contact. There are, however, some Hvar/Lisičići relationships, which are important for cross-dating. Obre II, level III is later Butmir, and Obre II, level IV is represented by intrusive Kostolac pits which are much too late for comment at this juncture.

Although there seems to be general agreement as to the content of the various strata, differences in interpretation have led to some confusion in labeling.

Benac in 1979 considered Obre I, level II as Proto-Kakanj, with levels III and IV as early and full Kakanj. Both here and in Obre II, level I, we may have somewhat parallel cases in that Obre I, level II is probably a Starčevo layer with intrusive elements penetrating its upper portion from above, while Obre II, level I, as analyzed by the Steruds, would be Kakanj III, with a similar penetration of Butmir and other elements downward into its later levels, or by imports from contemporary Butmir sites. Either or both cases of admixture could have re-

sulted from trampling during the muddy season, but neither seems to represent a local developmental transition.

In grouping her radiocarbon dates Gimbutas (1974a:16) combines Obre levels I and II into a single IA (Starčevo) unit, whereas Benac (1973a:420) designates them as Starčevo/Impresso I and II. For Obre II, Gimbutas identifies two major phases divided into subphases that are much earlier than the Kostolac pits and labels them as Butmir I, II, and III. Like Benac and in contradistinction to the Steruds, she considers Obre II, level I as Butmir Ia and Ib and as transitional rather than as a defined Kakanj III.

For the purposes of this chapter it seems best to refer to the Obre periods and phases by site stratification, with the following cultural designations: *Obre I:* Phases I and II Starčevo-Impresso, Phase III Early Kakanj, Phase IV Developed Kakanj; *Obre II:* Phase I Developed and Late Kakanj (Benac and Gimbutas—Butmir I), Phase II Butmir I (Benac and Gimbutas—Butmir II), Phase III Butmir II (Benac and Gimbutas—Butmir III), Phase IV Kostolac.

Our equations and averages of the Obre radiocarbon dates follow; for the individual dates see table 7.

Suggested synchronisms for Obre I (Benac 1973a:418–27, with comparative tables on pp. 425–26) and for Obre II (pp. 182–86) are as follows (see also Benac 1979):

Obre II, level III. Our Butmir II (Benac Butmir III) = Lisičići/Hvar II = Diana/Bellavista = Larissa/Rakhmani = Vinča D1 = Sopot Lengyel II/III.

Obre II, level II. Our Butmir I (Benac Butmir II) = Danilo IV–Hvar Lisičići = Serro d'Alto/Diana = Dimini IV/Larissa = Vinča C = Sopot Lengyel II = Lužianky/Lengyel = Petreşti/Turdaş (Petreşti A-B).

Obre II, level I. Our Kakanj III (Benac Butmir I) = Kakanj III = End of Capri/Ripoli/Scaloria = Dimini II/III = central Greece Neolithic = Vinča B2 = Sopot/Lengyel Ib = Želiezovce/Lengyel = Turdaş/Petreşti (Petreşti A/A–B).

Obre I, later level IV. Kakanj II = Dimini II/III = Arnautovići/Kakanj III = Danilo II/III = Capri Scaloria.

Obre I, level IV. Kakanj II = Gornja Tuzla V = Sopot/Lengyel IA = Vinča A2 = Boian B = Sesklo III (?) (our Thessalian Middle Neolithic) = Dimini I/II = Danilo II = Adriatico/Capri I.

Obre I, levels III/IV. Kakanj = Boian A.

Obre I, level III. Our Kakanj I = Danilo I = Adriatico I/II/Stentinello/La Quercia = Gornja Tuzla VIa = Vinča Al = Boian A = (*Vorsesklo*) Sesklo I and II (our Thessalian Early Neolithic 3).

Obre I, levels II/III. Late Starčevo = Leţ III (Criş III).

Obre I, levels I/II. Starčevo III/Cardium Impresso = Gornja Tuzla VIb = Starčevo "spiraloid" = Leţ II = *Vorsesklo* (Barbotine, "*Nagel,*" cardium) = Adriatico I/Cardium Impresso.

For a summary of calibrated dates from Gimbutas (1974b:16) when averaged, see the table below.

Since Obre I and Obre II are different sites, the close association of the dates from Gimbutas's Obre I, level IV, phase C and Obre II, level Ia suggests at least a partial contemporaneity of occupation during Kakanj III.

Odmut

From the Piva district in northwestern Montenegro, Srejović (1974:5; *RC* 19:473) gives ten purportedly Mesolithic dates from the rock shelter at Odmut. Six of these are earlier than the CRD tables and cannot be calibrated. The remaining four yield an average of 6080–5530 B.C. Marković (1974:10) describes Odmut III as early Neolithic with Starčevo elements as well as with traits of Crvena Stijena III–Smilčić type. Three close radiocarbon

Sites	*Level*	*Our Period*	*Gimbutas*	*No.*	*Range* B.C.	*Average* B.C.
Obre II	III	Butmir II	(III)		(No dates given.)	
Obre II	II	Butmir I	(IIb)	4	4935/4555–4725/4550	4725–4550
Obre II	II	Butmir I	(IIa)	3	4950/4705–4935/4695	4935–4695
Obre II	I	Kakanj III	Butmir I			
			Ib	3	5075/4870–5015/4725	5055–4735
			Ia	6	5200/4915–4730/4440	5210–4930
(Here Ib seems to be the upper part of the stratum in which the later elements occur.)						
Obre I	IV	Developed Kakanj	C	2	5300–4965	5265–5030
Obre I	III	Early Kakanj	B	1		5470–5235
Obre I	I–II	Starčevo/Impresso	A	2[a]	5865–5380	5785–5400

a. One determination has been omitted as being too early to be averaged with the other two dates.

dates from this layer yield a calibrated average of 6005–5500, with a range of 6060/5515–5965/4750.

Not only do these two averages approximate each other, but the first set coordinates well with Anzabegovo I, Veluška Tumba, and Čavdar (Karanovo I) and also with Anzabegovo II (8), Padina (3), and Lepenski Vir (3), while the dates for Obre I, levels I–II, fall only slightly later.

Since Batović (1979:634) equates Starčevo II with Obre I, levels I–II and late Impresso, it seems logical to assign Odmut I to our temporal equation I and Odmut II to our temporal equation II.

Although later dates for the late Neolithic and Eneolithic (*RC* 19:473) are not well enough identified for use, an Eneolithic date from level VI (Lab. no. Z 37) with no further comment gives a calibrated date of 3065–2860, and an Early Bronze Age one (Marković 1974:11), when calibrated, falls at 2205–1890. This is later than 2300 B.C. and is as it should be.

Albania

In Albania, although numerous sites are known, the number of those with significant excavations or adequate surface exploration remains relatively thin, and no radiocarbon dates seem available. The following summary is generally based on Prendi's article of 1982, supplemented by the somewhat more detailed breakdown of the Middle and Late Neolithic in the comparative table for the Adriatic zone by Batović (1979:634).

In northern Albania the Drim River system cuts through the mountains to the coast and provides access to the Metohija and Kosovo regions of inland Yugoslavia, with some elements recognizable at Rudnik near Kosovo (Prendi 1979:3; J. Glišić, pers. information), while upstream to the south the Shkumbi, Semeni, and Vijosë drainages lead toward Greece.

Early Neolithic

Southeast: The site of Vashtëmi is described as a single site with three horizons.

Equation I: Relationships with early Vršnik = Anzabegovo I = Veluška Tumba = Nea Nikomedeia. Some elements are similar to Proto-Sesklo (our Thessalian Early Neolithic 2), others to Pre-Sesklo (our Thessalian Early Neolithic 3).

Equation II: Some impresso and barbotine with limited links to Starčevo II/a = Kremikovci Ia = Karanovo I.

Northeast: Kolsh I is later than Vashtëmi. Kolsh I = Starčevo IIb = Vršnik II–III = Anzabegovo II–III = Kremikovci Ib.

Northwest: Blaz II = Kolsh I = Cardium Impresso = Smilčić I = Zelena Pećina III.

Middle Neolithic

Northeast: The Cakran group. Some items are found in Kolsh II with Vinča material. Its rhytons correspond to those of Danilo and Kakanj I. Barbotine is still in use and relates to Cakran and Elateia. A rough equation is Cakran = Danilo I = Proto-Kakanj (our Kakanj I or Obre I, level III) = Elateia II = Dimini I or Dimini-Tsangli.

However, although Prendi indicates that the Cakran material has not been sufficiently studied to support more detailed equations, the Batović table (1979:634) suggests the following: Cakran I = the end of Starčevo as at Obre I, levels I and II = La Quercia I = Pre-Sesklo (our Thessalian Early Neolithic 3.

Cakran Late I, II, most of III = Danilo I–III = Obre I, levels III–IV and Obre II, early level I (Kakanj III).

Cakran II = Sesklo I–II = Vinča A–B2 = Danilo = Kakanj = Scaloria, Ripoli II.

Cakran III = Sesklo III–Dimini I = Sopot II = Kakanj III (Butmir I or Obre II, level I).

Late Neolithic

Southeast: The Maliq-Kamnik group, phase IIa, seems related to Dimini, while Ib contains resemblances to Vinča *Bandkeramik* and shows close links with the Dimini Otzaki group. Generally this phase is transitional to the Eneolithic of Maliq II.

Eneolithic

Although some slight variations indicate two phases, Maliq IIa and IIb, they are not sufficiently distinctive to treat separately. Significant traits for Maliq II include some copper tools and some graphite pottery decoration.

Along the Adriatic, Maliq II = Hvar II/III = Obre II, levels II, III (Butmir II, III, our Butmir I, II).

In Italy, Maliq II = Ripoli I–III = the end of Diana = Serra d'Alto = Rivoli Chiozza.

To the north, Maliq II = Sopot III.

Eastward, Maliq II = Šupljevac–Bakarno Gumno–Crnobuki in Pelagonia = possibly the Hisar phase in Kosovo = Vinča C–D = Sălcuţa = Krivodol = Bubanj Hum I and also has some analogies with the late Neolithic in Greek Macedonia and Rakhmani.

Early Bronze Age, ca. 2100/2000–1800 B.C.

Maliq IIIa = Armenokhori in Pelagonia = Kostolac = the Aegean Early Bronze Age.

Maliq IIIb = Armenokhori–late Early Bronze Age. There are significant similarities to Early Bronze Age features in Macedonia at Servia, Kritsana, and Ayios Mamas, and in Epirus to Argissa Magoula III which pro-

vides a good parallel with Thessalian Early Bronze Age III, thus equating it with the Belotić–Bela Crkva group.

Middle Bronze Age, ca. 1800–1500 B.C.

Maliq IIIc = Middle Helladic II–III and Late Helladic I.

Late Bronze Age

Maliq IIId 1–3. Urnfield elements and Mycenaean elements from the twelfth century B.C., sometimes in graves with Late Helladic IIIc.

The Linear (Bandkeramik) *Complex*

Although some accept this complex as derived from the earlier Starčevo-Criş cultural grouping, such an interpretation seems highly unlikely. Although one may speak of a very broad, shared technocomplex, its general identification appears to rest on the use of stone tools, handmade pottery, spiral decoration, and the like. The sites show no internal development from one complex to the other; their geographic distributions, except perhaps at their fringes in northeastern Hungary, appear mutually exclusive, and in a detailed comparison of traits and elements there is no adequate complexity of resemblances either in quality or in number, while the total differences seem overwhelming and do not support such a derivation.

In those areas where Linear-*Bandkeramik* appears, it constitutes the earliest Neolithic culture. Despite its late dating as compared with the areas farther south, it is still usually termed Early Neolithic where it is at home. Bogucki's dating of late Linear in this volume is considerably later than that for Czechoslovakia.

In general one can distinguish three major subcomplexes of the Linear-*Bandkeramik* culture. Szatmár, the earliest, and the following Alföld-*Linearkeramik* (ALK) occur in the lower lands of northeast Hungary, reaching to the base of the foothills (Kalicz and Makkay 1977; Makkay 1982, and for the ecology see Kosse 1979; Sherratt 1982). In Lower Austria also there is now evidence for an early Linear phase preceding music-note pottery (Ruttkay, Wessely, and Wolff 1976).

A second, marked by the so-called music-note type of pottery decoration, is found from Lower Austria eastward and northward into Moravia, through the Moravian Gate and into Poland along the Oder and Vistula rivers, thence eastward north of the Carpathians and then southward into Moldavia and the Ukraine, where it is later than the surviving Criş and earlier than Pre-Cucuteni (Marinescu-Bîlcu 1974:140–41; Chapman 1981:21; Dumitrescu 1983a). West of Moravia its settlements occur thickly in Bohemia, up the Danube and down the Rhine. (See Wells, chap. 19; Thomas and R. Rowlett, chap. 17; and Bogucki, chap. 20, in this vol.)

The third, Želiezovce (Zseliz) complex, is primarily concentrated in western Slovakia, but occurs in Transdanubia as earlier than Lengyel and, more rarely, usually as imported fragments in Music-note contexts, in the eastern fringes of Lower Austria, scattered in Moravia, but with a large group in southern Poland around Krakow (Bogucki, chap. 20, this vol.). Scattered finds are reported in the Tisza and Vinča complexes (Filip et al. 1969:1669–70; Dumitrescu 1983a; Comşa 1974).

Variants equating chronologically with Želiezovce are the spectacular ceramics of the Bükk culture of central north Hungary, centered around the Bükk Mountains, and the distinctive Šarka ceramics of Bohemia, represented at some fifty sites, which are thought to be at least partly transitional to the stroked ware that follows.

A reduction of their summary as given in table 2 by Kalicz and Makkay (1977) for their study of the Linear-*Bandkeramik* in northeastern Hungary (also Makkay 1984) yields the following equations:

1. In the northeasternmost part of Hungary: Older Szatmár = Körös.
2. Throughout northeast Hungary: Later Szatmár = Late Körös/Proto-Vinča.
3. Across the northern Alföld: Early Alföld Linear (ALK) = Vinča A = early Late *Bandkeramik* (Transdanubia) = Barca III (eastern Slovakia).
4. Szákálhat = Zseliz or Želiezovce (western Slovakia) = Zseliz-Music Note (Transdanubia) = Vinča B1/B2 = Szilmeg (north central plain) = Bükk I, II, III (north-central Bükk Mountains).
5. Sopot-Bicske (Transdanubia) as derived from Vinča B2 = Vinča C.
6. Tisza (northern Alföld) = Herpály (southern and eastern Alföld) = Vinča C-D.

In Yugoslavia the dot-filled ribbon motif of Vinča and the long houses at Gomolava (pers. information from H. T. Waterbolk) strongly suggest a connection between Linear wares and early Vinča.

Averages for the calibrated radiocarbon dates for Czechoslovakia by Pavlů and Zápotocká (1982:21) are as follows; this list is entirely of the so-called early Neolithic period.

Culture	*Bohemian Phase*	*No.*	*Range* B.C.	*Averages* B.C.
Linear	IVa Middle Šarka	2	4755–4415	4575–4525
	III-IV Early Šarka	1		5275–4960
	IIa, b, and c	7		5235–4960
	Ic	6	5430/5045–5275/4970	5305–5075
	Ib	2	5520–5225	5520–5235
	Hungary			

Alföld Linear	7	5350/5085–5210/4925	5270–5025
Szákálhat	11	5395/5205–4545/4365	5205–4925

The earliest Bohemian phases 1b and 1c may equate with the Szatmár complex in Hungary, for which we have no radiocarbon determinations. In averaging we have deleted BM 563 from IIb as being aberrantly early, and since the dates for some of the subphases fall very close together, overlap, and give irregular internal results, we have combined them. Even so, the averages for the Linear phases and the determination for phase III-IV, labeled early Šarka, belong with them. The two middle Šarka dates, however, are considerably later and equate not with the two Stroked Ware culture dates of 4925–4555 B.C. and the two Lengyel IV ones of 4935–4695 B.C., but with two Stroked Ware dates of 4745–4560 B.C.. Three post-Jordanów (Bajč-Retz) dates average 4115–3880 B.C. and are still later.

In Hungary the seven dates designated Alföld Linear (ALK) compare well with the Bohemian Linear Ic through early Šarka as given above, as does another labeled young ALK or Bükk or Zseliz, while a "developed" Linear falls some seventy-five years earlier. Eleven Szakálhát dates, late in northeastern Hungary, again equate with the Czech Linear II and early Šarka.

Two Romanian Linear dates from Tîrpeşti in Moldavia, (Dumitrescu 1974a) calibrated at 5320–5060 B.C. and 5280–4980 B.C., again fit well with the Bohemian presumably Music-Note dates.

Other dates for this complex are three from south Germany (a fourth excluded as being far too late) with a calibrated average of 5190–4905 B.C., and four from Austria (a fifth again being excluded as inconsistent) averaging 5080–4880 B.C.. (For the individual dates, see Wells, chap. 19, this vol.)

For Poland (Bogucki, chap. 20) an average for two calibrated Linear dates is 5280–5050 B.C., with a total range of 5305–5000 B.C.

In Bulgaria four dates of the Hotnica culture from Kačica, Veliko Turnovo, have a narrow total range of 5265/5000–5250/4975 B.C. and an average of 5260–5000 B.C., thus falling in the same range as the Linear ones. Although we do not have dates for Karanovo IV, the dates for the Karanovo II and III-Starčevo equation should be somewhat earlier than the Linear ones, and for Karanovo V those of the Marica culture are slightly later, thus bracketing Karanovo IV and presumably equating it with the Linear complex and with Vinča-Turdaş.

For the west, Thomas and R. Rowlett (chap. 17, this vol.) give fourteen *Bandkeramik* dates from a single site in Aisne and five from another. Eliminating one determination as far too late but adding four others from the Rhineland, the average for the twenty-two calibrated dates is 5200–4915 B.C. The range for all these dates is 5675/5260–4920/4400 B.C. However, by eliminating the two highest dates and the lowest one remaining, the maximum range falls to 5390/4990–5050/4560 B.C., a reduction of some 445 years.

Thus the dates from Hungary, Austria, Czechoslovakia, Poland, south Germany, the Rhineland, and north and northeast France would seem to confirm the long-held hypothesis that the Linear-*Bandkeramik* expanded very rapidly throughout its whole area and was of relatively short duration.

For this horizon, then, radiocarbon determinations seem to support the rough equations of Vinča-Turdaş = Karanovo IV = Boian = Linear = Obre I, levels III, IV and Obre II, level I.

Temporal Equation IV

Tisza (Theiss) *Boian–Karanovo V (Marica)–Lengyel–Stroked Ware*

In the northern Alföld the Linear pottery was followed by the Herpály culture, which occupied the lowlands eastward to the Tisza and slightly beyond. In its southern part the Tisza (*Theiss*) complex followed Vinča-Tordos and apparently derived in part from both it and from the incised ware complex to the north. Eastward the Petreşti group occupied central and southern Transylvania, while east of the Carpathians the late stages of Criş survived until the arrival of the westward extension of the Pre-Cucuteni people from the Dniester into Russian and Romanian Moldavia and the northeastern corner of Transylvania (Dumitrescu 1982: map, p. 19; Ellis 1984: comparative table, pp. 10, 11, 31, and maps, pp. 18, 19, 29), and until the end of the linear wares in northern Moldavia.

Along the lower Danube south of the Carpathian Alps, the Tisza culture extended eastward across Oltenia as far as the Vădastra group on the lower Olt drainage. Beyond the Vădastra area, the Boian group characterized Muntenia, its latest, or Vidra, phase extending southward into the Tundža drainage, while the Marica culture with three phases, formerly designated Karanovo V (Todorova 1978), occupied the Marica and lower Tundža valleys. Unfortunately we have no specific radiocarbon dates for the Marica or Karanovo V culture at this time, and these two chronological positions must be fixed relatively. In northwest Bulgaria both Vădastra and some Vinča settlements came southward from across the Danube, while Vinča C/D (Vinča-Pločnik) persisted in the southern Danube and Sava drainages (Garašanin 1979).

Farther west in Hungary, the Lengyel complex, recognizable by its distinctive pottery, developed through four phases in Transdanubia (Dombay 1960: map, p. 11), spreading northward and appearing in the Burgenland

and in Lower Austria (Ruttkay 1981, 1983), the Little Alföld, in southwestern and central Slovakia as Ludanice (Lengyel IV), northward along the eastern side of the Czechoslovakian Morava, or eastern Moravia, into Poland and Silesia. Its later unpainted Polish Jordanów phase also appeared in Bohemia.

In Bohemia the incised Linear or *Bandkeramik* wares passed through the late Linear Šarka phase and were followed by the late Stroked Ware or *Stichbandkeramik* which has strong affiliations with the early Rössen and with cultures beyond the Erzgebirge or Ore Mountains to the west (see Wells, chap. 19, and Thomas and R. Rowlett, chap. 17).

Leading equations: Late Šarka = Early Stroked = Lengyel IV = Boian IV = Early Varna culture. In western and central Slovakia, Lengyel III = Tisza in eastern Slovakia.

Identification	*No.*	*Range* B.C.	*Average* B.C.
Early Stroked	2	4975–4435	4925–4555
Lengyel IVa	4	5190/4900–4745/4420	4935–4695
V	2	4920–4490	4745–4560
VI	6	5100/4835–4415/3955	4565–4435
(Transdanubia; from Kalicz and Raczky 1987:29)			
Tisza	16	53665/4965–4545/4410	4985–4730
Csöshalom	5	4960/4515–4550–4390	4745–4560
Boian IV	10	5110/4855 –4555/4395	4740–4560
Sava-Varna Transition & Early Varna	5	5085/4730–4935/4553	4935–4695
Varna culture	8	5085/4730–4445/4325	4560–4430
Poljanice II/III	2	5100/4815–4735–4555	4595–4545
IV	2	4725–4540	4595–4545
Polish Stroked	1		4750–4430
(See Bogucki, chap. 20, this vol.)			
Karanovo VIa and KGK	26	4975/4565–3935/3660	4550–4420
Herpály	28	4745/4560–4430/4335	4575–4540
Vinča B	3	5015/4555–4575/4420	4595–4545
C	3	5280/4985–4565/4365	5015–4725
D	1	5200/4750–4575/4525	4760–4685

In the above list of averages, Early Stroked equates with Lengyel IVa, Tisza, the Sava-Varna Transition and Early Varna, Poljanice II/III, and apparently with Vinča B-C. The reversal by which the Vinča B dates appear earlier than those of Vinča A may be the result of insufficient sampling, geographic distribution variation, or perhaps misattribution of the sample.

As given here, Lengyel V and VI appear progressively later than Lengyel IV. Lengyel V = Csőshalom = Boian IV = Vinča D.

Ruttkay's eleven dates for her Moravian Austrian Lengyel group (Ruttkay 1983:52–53), when averaged, seem to coordinate well with the two dates for Lengyel V and the five from Czőshalom.

Lengyel VI = the Varna culture = Poljanice IV = Karanovo VIa and Herpály.

As a whole, the dates listed generally fall between 5,000 and 4,500 B.C.

Temporal Equation V

Lengyel–Varna (Goljama Delčevo)–Karanovo VI–Gumelniţa

The chronological relationships of this period are quite complex. To keep oriented, one must bear in mind the basic geography that was operative in the distribution of the preceding cultures and also in the following ones. Thus the Lengyel tradition continues in Transdanubia with extensions as far as western and south-central Slovakia, eastern Moravia, and northward into Poland, westward into Lower Austria, the Burgenland, and Bohemia. (See for example the symposium on the Lengyel culture, Študijné Zvesti 1969; see not only the article by E. Neustupný but other papers as well.)

For Slovakia, the cleavage between west and east continues (Pavúk and Šiška 1981) and remains anchored to the major river systems, which in south-central Slovakia flow west to enter the Danube above its so-called knee, whereas the tributaries of the Tisza drain eastern Slovakia, the cultures of which are, not surprisingly, extensions of or derived from northeastern Hungary.

Since there are several suggested equations in greater or lesser detail and completeness, and since these tend to vary slightly, it seems best to pull together what we can in a general pattern, leaving further references for detailed analyses in the bibliographies of the works cited, and to use the calibrated but uneven radiocarbon dates to act as checkpoints within the suggested network.

We start then with Bognár-Kutzián's equation for her Early Copper Age (1972:207–8). She divides the Tiszapolgár culture into two phases and four groups with Lucska, the most northerly, extending into eastern Slovakia; Basatanya, concentrated in northeastern Hungary; Tiszaug along the Tisza River; and Deszk clustered around the Maros junction, with a few outliers toward the Danube. She shows her earlier phase primarily clustered along the northern part of the Körös system drainage (map 35, p. 191).

For the Early Copper Age she lists the following extended equation: Tiszapolgár AB = Gumelniţa late A2 and early B1 (Late II and early IIIa–Karanovo VI 2) = Sălcuţa II and early III = latest Vinča-Pločnik = Cucuteni A 3–4 = Tripolye latest A, B1-early Pitgrave Kurgan (Sredni Stog II) = late Petrešti = Sopot-Lengyel, latest III = latest Lengyel, including unpainted and Brodzany type = earliest Ludanice = late Rössen = beginning Gatersleben. To this we add Sitagroi III in

Greek Thrace (Renfrew 1971; Renfrew, Gimbutas, and Elster 1986:173).

Dimitrijević (1979a), Kalicz (1980), and Makkay (1976a) describe the Balaton-Lasinje I sites as derived from Vinča and as occupying the territory between the Sava and Drava rivers, following their upper waters into the eastern Alps and reaching into central Slovenia as the first settlers there. In Transdanubia their sites are later than the Lengyel ones, and the two cultures differ markedly. Kalicz equates Lasinje I with Lengyel-Ludanice in Slovakia, Bodrogkeresztúr, Jordanów, Münchshöfen, Bubanj-Hum Ia, and Sălcuţa (Kalicz 1980, fig. 2, pp. 248, 249; Makkay 1976a:270).

Two dates for Stroked Ware V (Pavlů and Zápotocká 1982) fit Bohemia into the pattern. Of sixteen Lengyel dates cited by Bogucki (chap. 20, this vol.), eleven are within this range when averaged and five are somewhat later, equating with Bayč-Retz (Pavlů and Zápotocká 1982:21) and suggesting two phases. In West Germany on the upper Danube near Ulm, Ehrenstein also belongs in this later phase and is actually a part of the Michelsberg complex, as is Schussenried, which extends into Bohemia, where Michelsberg elements also appear in late Jordanów (Jordansmühl) contexts.

According to PDČ (1978:245–46), Late Rössen parallels Michelsberg II in West Germany and is the earliest correlation in Bohemia, in which Michelsberg III and IV mostly appear. Classic Michelsberg does not appear as an entity but does appear with late Jordanów, and above all with Schussenried.

Kalicz (1980:250, and map, fig. 3, p. 279) sees marked archaeological differences between Lasinje II-III and the preceding Lasinje I. Their geographical distributions differ significantly, although both sets of sites occupy unfavorable areas of the eastern Alps and Slovenia. Neighboring culture areas to the west are the Altheim, following the Münchshöfen and Schussenried, the Baalberg to the north, and the Lažňány and Hunyadi-halom or Sălcuţa IV on the east. See also Makkay's table equating the cultures of the southern Vojvodina and the southern Alföld with Transdanubia (Makkay 1976a:270).

On the basis of graphite ornament on pottery as well as some other elements, Karanovo VI in eastern Bulgaria, Gumelniţa to the north in Romania, Sălcuţa in Oltenia and the eastern Banat, Krivodol in northwestern Bulgaria, Bubanj-Hum I and II in the Morava River basin around Niš and southward as well as on the Timok, at Šuplejevac and Bakarno Gumno in Pelagonia and at Maliq II and III in Albania (e.g., Garašanin 1982:148), are all associated and are considered by many as variants of a single widespread culture complex.

There is a consensus that the Cucuteni and Tripolye sequences run more or less parallel and are very closely related, although there are some differences as to how their phases match up in detail (e.g., see Bognár-Kutzián 1972; Ellis 1984; Gimbutas, chap. 22, this vol.). On a general and simplified scheme, Ellis (1984:31) shows (1) late Pre-Cucuteni II slightly overlapping with Tripolye A, which predominantly equates with Pre-Cucuteni III; (2) Cucuteni A = Tripolye B 1–3; (3) Cucuteni AB = Tripolye B II; (4) Cucuteni B = Tripolye CI 1.

For her western Black Sea coastal strip, Todorova (1978: table I, p. 183) shows the Varna culture as contemporary with Karanovo VI, Gumelniţa, Krivodol II, and early Sălcuţa.

With regard to the twenty-seven individual dates grouped as Karanovo VI-KGK below, the total potential range is 5040–3660 B.C. as shown. However, eliminating the two highest and the one lowest date in the series results in a total range of 4765–3950 B.C., some 565 years less.

Marija Gimbutas has recently made available three radiocarbon dates from Poduri in Romanian Moldavia (see chap. 22). These yield an averaged date of 4935–4695 B.C., which accords well with Early Stroked and Lengyel. Although this is somewhat earlier than our averaged Gumelniţa A2 dates from Cascioarele with which she would equate them, the Poduri dates fall within their range.

Among the averaged calibrated dates with which this note is associated, thirteen Gumelnita A2 dates from Cascioarele give a range of 5040/4555–4390/3915 B.C., with an average of 4460–4410 B.C.

Identification	*No.*	*Range* B.C.	*Average* B.C.
Gumelnita A2 (Cascioarele)	13	5040/4555–4390/3915	4460–4410
Sitagroi III	5	4755/4545–3975/3285	4425–4320
Polish Lengyel			
Phase I	11	4565/4435–4360/3790	4405–4095
Phase II	5	4150/3775–3860/3490	3895–3765
	(See Bogucki chap. 20)		
Bayč-Retz	3	4385/3940–3890/3760	4120–3875
Epilengyel	2	4135–3630	3910–3760
Varna culture, final phase	2	3945/3775–3900/3665	3905–3775
Michelsberg			
Ehrenstein III	7	4145/3895–3995/3790	4115–3880
Ehrenstein IV	12	4420/3905–3910/3760	3980–3865
Schussenried	8	4420/4090–3955/3795	4140–3890
(See Wells, chap. 19, this vol. and Pape 1979)			
Tiszapolgár	8	4400/4075–3865/3495	3960–3795

In the above list Ruttkay's two Epilengyel dates (1983:55) accord well with or overlap Polish Lengyel, phase II, Bayć-Retz, the final phase of the Varna culture, Michelsberg (Ehrenstein III, IV and Schussenried), and Tiszapolgár. Early Stroked fits chronologically with late Lengyel, Boian IV, Varna, Tiszapolgár, and Polish Stroked, all of which fall in the first half of the fifth millennum, while the averages for Czechoslovakian Lengyel, Karanovo VI (KGK VI), Gumelniţa A2, Goljama Delčevo, Bub (Varna), and Sitagroi III in equation V all fall between 4575 and 4320 B.C. The ranges of course are wider and more variable. Also, at Sitagroi in Greek Thrace a chronological and cultural break is said to occur between phases III and IV.

In two papers Makkay (1976b and 1985) raises a question concerning the goldwork from the Varna cemetery as a chronological marker. In the first he stresses that the production of goldwork in east-central Europe, as appearing in the Bodrogkeresztúr and Gumelniţa cultures of the middle Eneolithic period, apparently ceased before the Baden period and thus seems to reinforce the inclusion of the Varna culture in this equation. In his second article he finds similarities between several Varna gold objects and some dated approximately fifteen hundred years later. Since calibrated radiocarbon dates generally confirm a middle Eneolithic dating of ca. 4500–4000 B.C. and earlier, one is temporarily at a loss to find a satisfactory and definitive explanation. It seems highly unlikely that the similarities persisted over so long a time when none have appeared in the interim. This leads to the suspicion that the resemblances are not sufficiently complex and numerous to justify an assumption of relationship.

Temporal Equation VI

Bodrogkeresztúr-Cucuteni–Pitgrave Kurgan–Late Sălcuţa, Gumelniţa, and Karanovo–Jordanów–Jevišovice C2–TRB/C.

This period is one of continuities and discontinuities in that some traditions persist or end and others, of longer or shorter duration, appear.

Working without benefit of radiocarbon determinations, Bognar-Kutzián's equations span a wider time frame with somewhat less precision than is now possible (Bognár-Kutzián 1972:207–9).

For her Middle Copper Age she gives the following rough equation: Bodrogkeresztúr AB = Ludanice = Lažňány in northern Transylvania = Lasinja = Cucuteni AB and B, Tripolye B II and Cy II = the Pitgrave Kurgan culture = Sălcuţa Late III and IV = Gumelniţa late BI and BII (Late IIIa and IIIb-Karanovo late VI 2 and its following hiatus = earliest Ezero = Cernavodă I = Bubanj-Hum Ia = Hisar Ia in the Kosovo Metohija = Jordanów = Jevišovice C 2 = Funnel Beaker C = Gatersleben. Most of these fall between 4000 and 3500 B.C. in the calibrated radiocarbon framework.

Today calibrated radiocarbon dates suggest that Balaton-Lasinje 1 = late Early Bodrogkeresztúr B and lasts at least until late Boleráz, and in eastern Bulgaria Pevec falls in the hiatus between Karanovo VI and VII.

In this series Bodrogkeresztúr occupies much the same territories as Tiszapolgár in northeastern Hungary, but with some westward extension across northern Hungary as far as the Danube. The Lažňány group, although appearing in eastern Slovakia, essentially fills the geographical gap in Transylvania between the Bodrogkeresztúr complex and Cucuteni to the east and also along the north.

To this point there is general agreement that we have been dealing with localized or essentially indigenous cultures, after which there occurred westward movements of what were essentially steppe peoples, some of whom had already, to some extent if only temporarily, settled down.

Of the few radiocarbon dates available for this equation we have the following:

Identification	*No.*	*Range* B.C.	*Average* B.C.
Early TRB			
Lower Austria	2	3890–3660	3880–3665
Bohemia	7	3885/3665–3385–3125	3665–3505
(Balaton Lasinje II–III)	(2)	3865/3550–3675/3485	3685–3505
Bodrogkeresztúr	2	3839–3485	3865–3550
(Confirmatory dates from the west as given by Pape 1979)			
Mondsee	4	3880/3530–3670/3370	3660–3485
Baalberg	2	3875/3490	3795–3640
Salzmünde	2	3675/3345	3670–3500
Upper Austria	Ruttkay (1983)		
Mondsee	17	3880/3650–3045/2790	3525–3360
Lower Austria	3	3380/3155–3375/3145	3375–3155

In Bohemia, of the seven radiocarbon dates attributed to the Early Funnel Beaker culture, the four from Makotřasy are ascribed to the later part of Early Baalberg (Pleslová-Štiková 1976, 1980) and the remaining three seem also to belong in the early Baalberg range. In extension of our equation, Ottoway (1976:117) refers to a consensus that the Austrian Mondsee is coeval with the Altheim, Baalberg, and Salzmünde cultures of south Germany, and also with the Pfyn-Cortaillod cultures of Switzerland (see Wells, chap. 19, this vol., and also Pape 1979).

The two TRB dates from Lower Austria (Ruttkay 1983:55) are slightly earlier than the seven from Bohemia, and her seventeen dates labeled Mondsee (pp. 54–55), when averaged, fall about 150 years later than those given by Pape.

Temporal Equation VII

Coţofeni-Ezero-Cernavodă–Karanovo VII–Usatovo Folteşti-Baden-Kostolac-Řivnáč-Cham–Vučedol/Zók–Globular Amphora–Corded Ware–Bell Beaker

After the Bodrogkeresztúr phase a series of regional variants with slightly differing time relationships appeared in Hungary and some of them spread fairly widely. These are subsumed under the name of Baden but include (1) Boleráz, earliest Baden which is related to Cernavodă and equates with Jevišovice C I, falling beyond Cannelated and Ludanice; (2) Úny, described as Hungarian cannelated; (3) Viss in northeastern Hungary, belonging with Pećel described as a Baden phase in the Carpathian Basin, and (4) Bošáca, along the Moravian Slovakian border in the eastern Morava and the west Slovakian Vah valleys. Its older phase = young cannelated with Kostolac elements = early Jevišovice B.

In the northwest, Bohemia again served as a nexus for a variety of peoples with varying cultures and as a focus for wide correlations. Thus the Řivnáč culture of north-central Bohemia has close relationships with the Cham group of Bavaria (Pleslová-Štiková 1968b, 1969:15–24). Cham appears in southern and southwestern Bohemia (PDČ: Map 2), and Ottoway's nine Cham oldest dates (Ottoway 1986:735) are almost identical with the single Řivnáč date from Homolka. At Homolka the presence of Vučedol elements and imported sherds of Globular Amphora vessels gives further cross ties. At other sites there are some signs of partial contemporaneity between the middle Corded Ware and Řivnáč people on the one hand and perhaps the later Corded Ware and Bell Beaker people on the other (e.g., Pleslová-Štiková 1974: 172–77).

Both Corded Ware and Bell Beaker sites appear in considerable strength in the loess of north Bohemia (PDČ: map 3). They appear to have been, at least to some degree, contemporary. There does not, however, seem to have been much contact between them. The Řivnáč and Cham sites, although earlier, may have overlapped with early Corded Ware. Since the Corded Ware people sem to have been predominantly pastoralists, the Řivnáč people were settled farmers, and the Bell Beaker people, known mostly from graves, have been thought to be either propectors or traders, the three groups may well have exploited somewhat separate economic niches in the same territory.

Although the Corded Ware traces from the north are almost nonexistent in Moravia, Bell Beakers are numerous and striking and closely follow the Danube to below its knee and southward as far as Csepel Island below Budapest. These west Hungarian occurrences are relatively numerous and occur in pits that indicate settlements as well as in graves, but Kalicz-Schreiber (1976:21) states emphatically that in Hungary the Bell Beaker complex does not represent a self-contained culture, but that it appears as a recognizable component in a mixed context consisting mainly of Makó elements which continued into Proto-Nagyrév and Early Nagyrév times. By Late Nagyrév Bell Beakers disappear. Shennan (1976:231–39) pursues a somewhat similar line for Bohemia and Moravia. However, the repeated association of Bell Beaker traits—nonceramic and ceramic—in recognizable clusters brings into question Shennan's attempt to explain this complex in industrial trade terms or as societal preference or demand.

One may well continue to regard the Bell Beaker complex, here at least, as probably indicating an ethnic group of people dispersed in small units that were absorbed by the already resident populations. The truth may, of course, lie somewhere between these two views. In any case, over a wide area Bell Beakers provide a useful marker that has broad implications for establishing chronological relationships.

Baden and Kostolac have appeared as separate entities in northwestern Yugoslavia, with Kostolac slightly later. However, they frequently appear together and then are termed Baden-Kostolac, implying some contemporaneity but with Kostolac apparently surviving later. This is also true in the Danube Valley of western Romania. Although Kostolac occurs in Transylvania, it also appears in the overlying pit at Obre on the middle Bosna, indicating a very wide geographical range.

The gap between our Baden and Vučedol dates reflects a hiatus found at both Sarvaš and Vučedol itself (Schmidt 1945), where Vučedol phases I and II are lacking and only phases III and IV appeared.

Although we have been using the term Vučedol to avoid confusion, it is now customary to refer to the general culture as Vučedol-Zók. The site of Vučedol lies in Croatia and that of Zók in southern Hungary, the combined term representing linguistic differences, Serbo-Croatian and Hungarian, in the designation of a single culture.

To the east the Ezero culture occupies Bulgarian Thrace (Garašanin 1982a). Despite a series of twenty-eight dates from the eponymous site identified by levels (Georgiev et al. 1979), the radiocarbon dates do not accord with the sequence given. Even when Quitta combined them (1978) into two major groups labeled A (twelve dates) and B (fifteen dates), when calibrated and averaged, there is still no distinction between them.

Farther north the Cernavodă groups seem essentially nomadic, moving westward from the Dobrudja and lower Danube to Oltenia and subsequently farther west over a

considerable period of time, as did some of the Usatovo Folteşti-Gorodsk groups established northwest of the Black Sea. Five closely grouped dates attributed to the Usatovo culture, one from Usatovo itself and the other four from Majaki, have a calibrated average date of 3165–2915 B.C., and virtually identical are two dates from Mikhailovka I (Gimbutas 1980b:277, 282; for her Kurgan II period see her map on p. 275).

Ecsedy (1979:56) agrees that the Corded Ware peoples were part of this westward movement traveling across the north, but sees their origins in the forested steppe in that they do not have Kurgan burials and also that their remains are lacking in the truly forested zone.

Although there seem to have been indigenous changes, the existing Neolithic cultures apparently came to an end in the middle Danubian and Carpathian basins as the result of invasions, both primary and secondary, by peoples of the steppe who moved westward from the east and southeast. Despite several attempts to deal with chronological aspects, cultural impacts, and the like, specifics of the disintegration of the Neolithic patterns are far from clear (*Godišnjak* 1983).

For the most part there is general agreement that the incursions and influxes were of people of the Cernavodă complexes. Unfortunately we have almost no radiocarbon dates, and culturally the Cernavodă sites are small, scattered, and briefly inhabited, while most of those excavated have been cursorily sampled. A further difficulty is that the designations Cernavodă I, II, and III represent separate groups occupying different territories but the boundaries of which more or less coalesced in the Cernavodă area. Although these are to some extent identifiable, the sequence and details of their movements are vague. There is some question as to whether Cernavodă II represents merely a variant of ceramic style or a subcultural difference. In any event, a shared stylistic pottery complex that appears in different sites would apparently indicate a recognizable group, however small.

Although the Cernavodă groups almost certainly came from the north Pontic Steppe and settled temporarily before moving voluntarily or being pushed farther to the west, there are questions as to their temporal relationships, for example, whether the movement of Cernavodă II preceded that of Cernavodă III, took place at the same time with Cernavodă III surviving later, or whether Cernavodă II arrived after Cernavodă III but did not last as long. It is virtually impossible to arrive at answers to questions of appearances and survival until an adequate corpus of radiocarbon determinations exists.

In reexamining the Bubanj-Hum material, M. Garašanin reports two important gaps—one between Bubanj-Hum Ia and his new Bubanj Ib, into which he would intercalate Sălcuţa IIc(?)-IV and Cernavodă I, and a second gap between this stage and the incursion of Baden-Kostolac into which he would insert the evolution of Cernavodă III-Boleráz and Classic Baden. His sequence would then read Bubanj-Hum Ia, Sălcuţa II?-IV, Bubanj Ib, the evolution of Cernavodă III-Boleráz-Classic Baden and Baden-Kostolac (M. Garašanin 1983:25).

In the same volume, writing on Romania, Roman (1983:117–23) thinks Cernavodă I = Cucuteni AB and B = Decea Mureşului = end of Usatovo-Gorodsk = oldest eastern Globular Amphora = Sălcuţa IV and Pevec in Bulgaria in the hiatus after Karanovo VI. Second, Cernavodă III-Boleráz = Coţofeni = Baden. (For the Coţofeni group see also Roman 1976 and for the Baden culture in Romania see Roman and Németi 1978.)

In a series of maps he shows the following distributions: (1) Cucuteni in Moldavia and Cernavodă I in Muntenia, Oltenia, and eastern Transylvania; (2) Sălcuţa in Oltenia and northwestern Bulgaria; (3) Cernavodă III in Muntenia and Oltenia, Globular Amphora in Moldavia, and Boleráz in northern Transdanubia; (4) Early Coţofeni essentially in Transylvania, Cernavodă II in southeast Muntenia, Folteşti in Moldavia, and Ezero in Bulgarian Thrace; and (5) Glina III in Muntenia, Schneckenberg on the upper Olt and southeastern Transylvania, Makó and Nyirség east of the Tisza, and Jamna in south Russia, and eastern Muntenia.

For further comments on the Eneolithic migrations of the Pit Grave steppe groups into the Carpathian basin, the Danube Valley, and the Balkan region see Tasić 1982–83, particularly his map (p. 17) and table (p. 19).

Identification	*No.*	*Range* B.C.	*Average* B.C.
Baden	4	3395/3025–3150/2370	3360–2995
Baden (Lower Austria)	3	3380/3155–3375/3145	3375–3155
Bošáca (late cannelated)	1		3370–2950
Sitagroi IV	7	3395/3145–3170/2885	3355–2980
Coţofeni (with Kostolac and Vučedol	7	3375/3145–3170/2910	3175–2935
Cernavodă	3	3375/3025–3045/2790	
Ezero A, XIII–IX	13	3370/2950–2900/2615	3150–2900
Ezero B1, VIII–IV	15	3390/3155–2905/2540	3165–2915
Mikhailovka I	2		3155–2895
Usatovo-Majaki	5	3360/2910–3055/2885	3165–2915
Bernburg (Pape)	5	3390/3150–2920/2640	3165–2905
Kostolac (Pape)	4	3580/3035–2910/2580	3030–2875
Řivnáč	1		3025–2950

Cham (Ottoway *RC*)	9	3370/3145–2930/2800	3040–2885
Vučedol (*RC* 21:1)	8	3155/2970–2890/2540	2945–2790
Globular Amphora, Germany, etc.	9	3365/2895–2410/2115	2925–2790
Ocher Grave	3	3845/2790–2895/2525	2910–2630
Cham Hienheim (Pape)	3	3160/2900–2910/2530	2880–2630
Sitagroi Va	3	3160/2875–2405/2155	2875–2620
Middle Corded (Pape)			
Swiss	5	2925/2730–2895/2645	2895–2665
Auvernier France	9	2935/2645–2655/2320	2870–2545
Saale	6	2880/2635–2320/2090	2665–2535
Corded (Buchvaldek)	4	2655/2530–2415/2245	2550–2385
Bell Beaker			
Hungary (Csepel)	4	3025/2775–2415/2175	2670–2535
France	14	3365/2930–2650/2020	2670–2540
Sitagroi Vb	5	2655/2525–2410/2160	2560–2505
Netherlands	28	2900/2650–1995/1695	2425–2315
Italy	9	3360/2910–3055/2880	2320–2090
Early Bronze Age			
Únětice	1		2320–2135
Nagyrév	2		2225–1985
Odmut VII	1		2205–1890

Temporal Equation VIII

Early Bronze Age

We must emphasize that the major cultural break falls between the disintegration of the basic localized Neolithic patterns and the influxes of the Eneolithic peoples from the east which occurred in the various regions between 3250 and 2900 B.C. Although the Bronze Age is beyond the limits of this chapter, there is a strong continuity between the Eneolithic and Bronze Age cultures, modified mainly by the widespread adoption of full bronze technology and the variety of bronze products, improved farming practices, and better modes of transportation, particularly by horse, and the changes attendant upon them (see Shennan 1986).

On our table 2 the individual calibrated dates from Ezero range from 3390/3155 to 2900/2615 and the one from Celei Sucidava falls within that range. Their categorization as Early Bronze Age may well result from a difference in classification, or perhaps an Early Bronze Age appeared in southeastern Europe earlier than it did in the east central zone.

Traditionally given as somewhat later, Neustupný (1976:112–14) now sees the Bell Beaker culture ending and the Early Bronze Únětice and Nagyrév cultures beginning about 2300 B.C. and possibly lasting to somewhere between 2100 and 1850 B.C. In some areas the Early Bronze Age may have ended sooner. Based on relative relationships as well as on occasional radiocarbon determinations, a rough date of 2300 B.C. for the changeover from the late Eneolithic to the Early Bronze Age would seem to be acceptable for the entire area. Thus we close our discussion at that point.

Addendum—June 1987

Received too late for discussion are a review article on the Neolithic of Romania (Comşa 1987) and the first volume of the report of the Divostin excavations (McPherron and Srejović 1988).