VINČA CULTURE AND ITS CONNECTIONS WITH THE SOUTH-EAST HUNGARIAN NEOLITHIC: A COMPARISON OF TRADITIONAL AND ^{14}C CHRONOLOGY

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INTRODUCTION OF PRELIMINARIES

A new research program has been carried out in Szeged during the last fifteen years in order to investigate the chronological questions and the settlement pattern in the Hungarian Tisza-Maros region covering the time of the transition between the Late Neolithic (LNA) and Early Copper Age (ECA). In the course of this project a new series of charcoal and bone samples have been processed from the neolithic stratified settlements at Hódmezővásárhely-Gorzsa, Hódmezővásárhely- Kökénydomb, Szeged-Tápé-Lebő-A, Szegvár-Tűzköves and, from the single layer flat settlements at Deszk-Ordos and Deszk-Vénó.[1] The sites belong to the Middle Neolithic Age (MNA) Szakálhát Culture, the LNA Tisza Culture, the Gorzsa Group and the Proto-Tiszapolgár Phase of the Tisza Culture, which are cultural manifestations found in the middle and South Tisza region Hungary and in the adjacent areas of Yugoslavia and Rumania. In the selection of the sites we have relied on choosing both well-examined settlements and new ones, representing together the total span of LNA in this region. This note is thus the first complete radiocarbon-based chronology of this period in Hungary. The sequence of sites forms the base of a reliable internal chronology for the developmental phases of the Skakálhát and Tisza Cultures in absolute dates, providing also a basis for placing the LNA of the Tisza region properly into the wider frame of the South-East European Neolithic. In the discussion we used all the published and known dates from other laboratories as well.[2]

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[1] HORVÁTH, F. 1982, 201—222; HERTELENDI, E.—HORVÁTH, F. In press; HORVÁTH, F. 1986, 89—102; 1987, 31—46; 1988, 145—149; 1989, 85—101.

[2] *Charcoal and bone samples have been dated* by Ede HERTELENDI, Institute of Nuclear Research of the Hungarian Academy of Sciences, H-4001 Debrecen, Hungary.

METHOD OF ARCHAEOLOGICAL INTERPRETATION OF THE DATES

Because the method of the excavations was a detailed stratigraphical level-by-level one, in the first step we checked the concordance of individual measurements as uncalibrated radiocarbon years and the position of the samples in the relative layer sequence. The process of the method is shown on the example of the stratified tell-like settlement at Tápé-Lebő-A. The average total thickness of the layer sequence is 2.10 m, containing 17 levels within a 5 by 5 m. square. The 17 radiocarbon dates represent the ages of the levels. We consider a date to be in full concordance with both the time sequence and the relative (stratigraphic) sequence when its position on the time scale corresponds to the place of the sample within the layer sequence it has been collected from. Concordance is also acceptable when the date of the sample collected from a pit — or from any kind of feature dug into the underlevels — falls on a point of the time scale which is within the time span corresponding to the depth of the given feature. The date obtained in this case is the time of a level the sample originally belonged to before the digging of the pit. In four cases, there are contradictions between the relative stratigraphic position of the samples and the places of their dates on the time scale. Archaeologically only two interpretation seems to be possible: the properly collected samples were found in secondary places or the collector of the sample made technical mistake. The correction of the position of such data i.e. the determination of their original stratigraphical position can be done with high probability by drawing up the diagramm of the excavated square. This is a presentation of the levels — together with the depth of the features which have cut them- in an ideal, theoretically condensed single plane. (Fig. 1.) Since thirteen consistently correct (concordant) dates place the layer sequence on to an absolute time scale, we are able to determine the real level of the sample which has been found in a secondary place. The reliability of this method is in direct proportion to the number of measurements. As a matter of fact, this correction can be applied only in the case of detailed stratigraphical excavations, when the proper and detailed relations between the levels and the features are precisely documentated. This method is important when establishing the internal chronology and the settlement phases of a site. Besides the change of the settlement structure, the style of the artifacts and their proportions etc, which give a relative sequence of the settlements phases, such a correction and the clustering of the dates conserned helps to place them into the frames of absolute chronology (Fig. 2).

In the cases of the six examined sites, the clusterings and breakings of C 14 dates coincide with the sequence of the settlement phases, established on the basis of the observations made in the course of the excavations, and on the analisys of the artefacts, when we drow a parallel between the settlement phases of the six sites according to the C 14-sequence, not only the periods overlap each other on the basis of the C 14 dates, but contemporaneity is valid on the base of traditional cross-dating i.e. on the basis of the finds too.

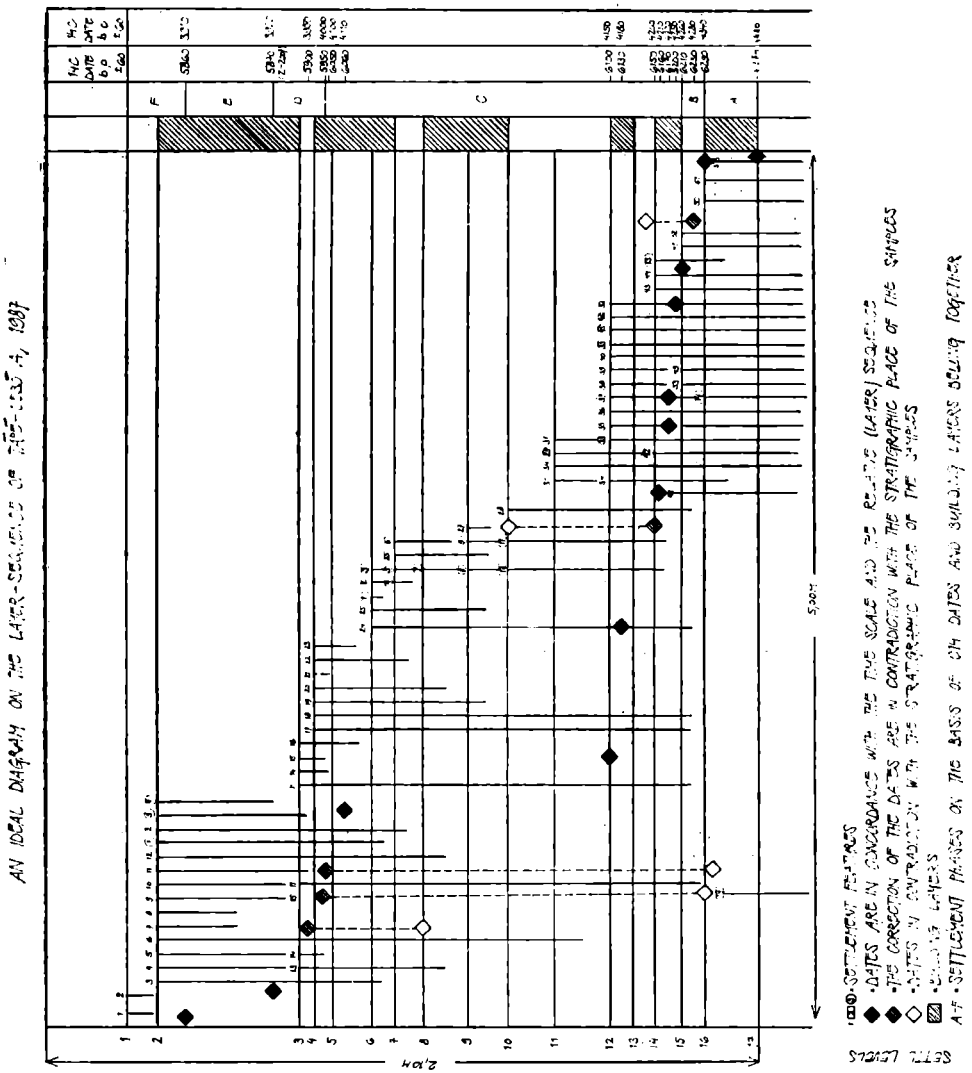

Fig. 1.

A SHORT OUTLINE ON CULTURE HISTORY

Since the time of the excavation at the toponym site of the Vinča Culture, more exactly since the comprehensive volume of M. Vasié on the Vinča Culture was published, its chronology has been the backbone of periodization in South-Eastern Europe.[3] Because the layer sequence of the Vinča tell comprises the whole time of Neolithic Age and, the different settlement phases produced evidences for the interconnections with cultures of far away areas by the great number of „imported" artefacts — the importance of this settlement is undoubtedly remarkably high. This is the reason for continous animated discussions which made this chronology more and more detailed. On accouont of the method of excavations in the 1930-es, reliable separation of individual layers and features — consequently those of the artefacts — was not possible, however. By newer evidence deriving from sites which have been excavated since that time, the chronology has considerably been improved. Progress and development in the chronology of the Vinča Culture have resulted owing to the work of I. Banner, B. Bruckner, S. Dimitrijević, M. Garasanin, Jovanović, V. Milojčić, N. Tasic, G. Lazarovic, D. Srejović and others. The latest summary of the culture by J. Chapman comprises all the evidence of that time and made the knowledge about the Vinča chronology more precise by using all the known radiocarbon dates. Because the utilization of this method of chronology is a chance which is really unexploited in connection with South-East European Neolithic and the increasing number of C 14 dates make it possible that the internal chronology and the connections of Vinča Culture with the neighbouring areas be reconsidered.

As an accumulation of chronological information most prehistorians have accepted the Körös-Alföld Linear Pottery (ALP) — Szakálhát-Tisza sequence an characteristic fon South-Eastern Hungary. On the basis of new excavations exposed over a larger area (besides the sites discussed in this paper: Battonya-Gödrösök and Parázstanya, Vésztő, Öcsöd, Herpály), the emergence of the Tisza Culture has been placed within the time span covered by the Szakálhát Culture (earlier MN late Szakálhát, or Szakálhát-Tisza transitions period, presently Tisza I). Such a division has been found necessary of the appearance of tell-based economy and telle settlements in this period.[4] The MNA Szakálhát Culture has been equated with the B1, the LNA early Tisza period with the B2 phase of the Vinča Culture. The middle (I-II, II) Tisza period has been regarded as contemporaneous with the end of Vinča B2 and the total span of C, and the latest (Tisza III) with Vinca D1. The Proto-Tiszapolgár and Tiszapolgár Cultures have been placed into the Vinča D2 period.[5]

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[3] VASIĆ, M. M. 1932—36, I—IV.

[4] MAKKAY, J. 1982. 60; KALICZ, N.—RACZKY, P. 1987, 14—19.

[5] KALICZ, N.—RACZKY, P. 1987, 25.

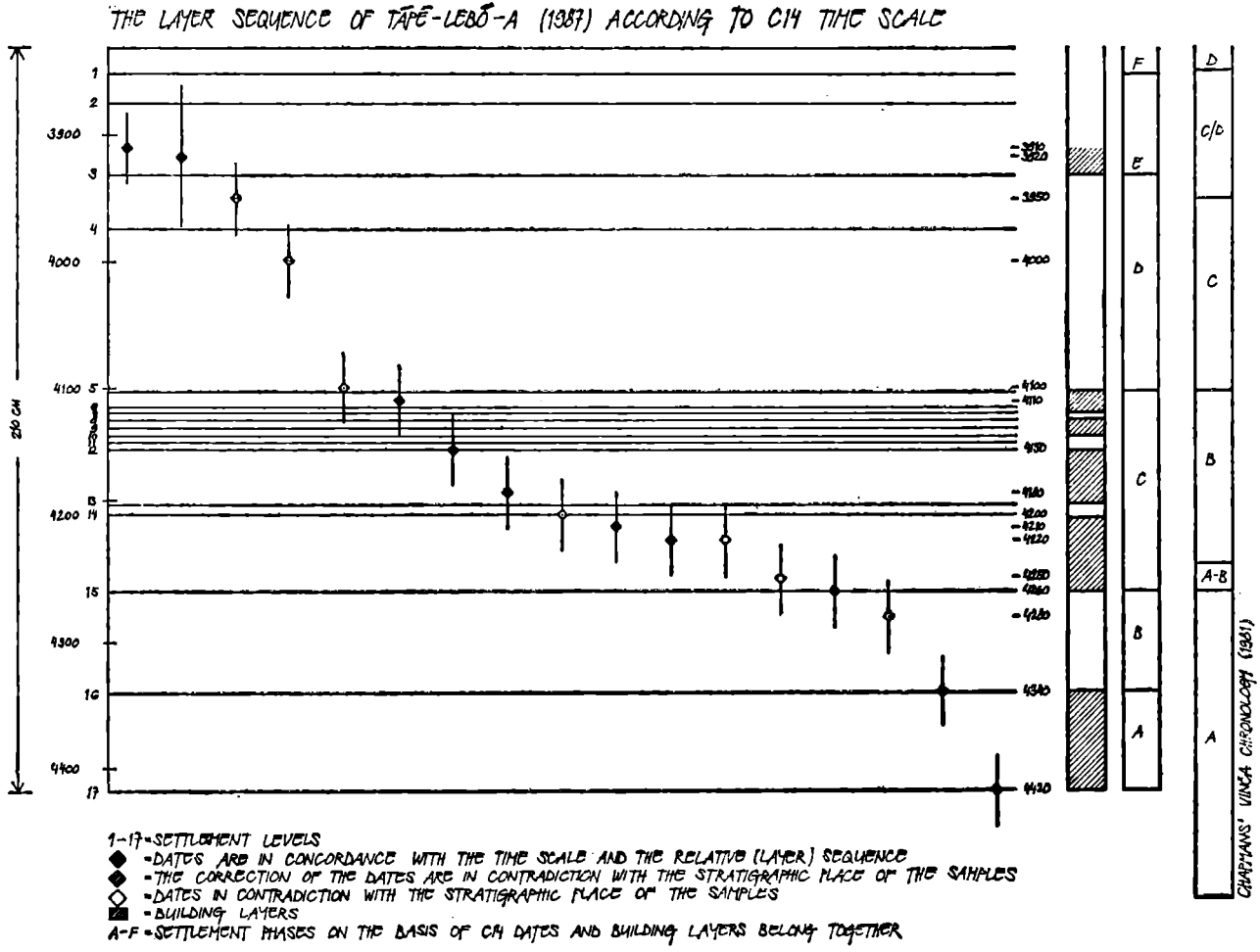

Fig. 2.

DISCUSSION

If the 60 radiocarbon dates of the Vinča Culture known at present are represented on a time scale separated by cultural phases on the basis of the excavators' definition as to where the samples were collected from, at first glance a rather heterogeneous general picture can be seen (Fig. 3). In the first column are shown the dates of the eponymous site which are not defined as part of the cultural phase. The horizontal lines devide the time-scale into cultural phases according to Chapman's system.[6] These and the other data deriving from the Vinča site within the following columns embraces the periods of Vinča from A—C. 7 data referring to such a long time span can hardly be regarded to be characteristic, howe- and Banjica the definitions of the samples as Vinča C—D period do not this question can only be found after the completion of the excavations being presently carried out at Vinča. Seemingly data from the A-period appear to be widespread. Apart from the A-period dates of Gornea and Ószentiván VIII, which look to be unbeliveably late,[7] the others fall within the limits of the Vinča A-period defined by J. Chapman, even if we consider the standard deviations too. The date sample from Gornea was very probably taken from a secondary position and dates a later settlement phase than Vinča A, that is, the retardation of this type of pottery can hardly be assumed. In the case of Ószentiván VIII consideration of the two high data is evident, for Vinča B-type artifacts have also been discovered there.[8]

We know only strikingly few dates which derive from samples defined belonging to Vinča-C-period. In the dates taken from Gomolava and Banjica the definitions of the samples as Vinča C—D period do not allow us to establish a definite dividing line between the two ones and, increase the proportion of dates on account of which the overlap between the four phases is considerable. Anyway the overlap of the data of the different periods — even if we disregard the dates obviously standing out from the range of dates of one given period — is extremely great. There are two possibilities to explain this feature. 1.: The overlapping dates of the different periods mean that the span of time of a cultural period established on pottery style significantly differs on different sites and geographical regions. 2.: The extremely strong overlap come from samples which were either collected from secondary position, or from an error of excavating technic. The presently known 60 Vinča dates very probably represent both causes. Anyway, such a little series for the more than one thousand year long Vinča A—D development is not sufficient to establish a reliable C 14 chronology of the culture. J. Chapman showed wide overlap in time between certain regional variants of the Vinča Culture on the basis of the combined analyses of the pottery and C 14 data. The increased number of C 14 dates since that time however, has not altered Chapmans' system basically.

[6] CHAMPMAN, J. 1981, I. 17—31.
[7] Radiocarbon, 1970, 411; CHAPMAN, J. 1981, II, 444; QUITTA, H.—KOHL, G. 1969, 244—245.
[8] KALICZ, N. 1977, 111.

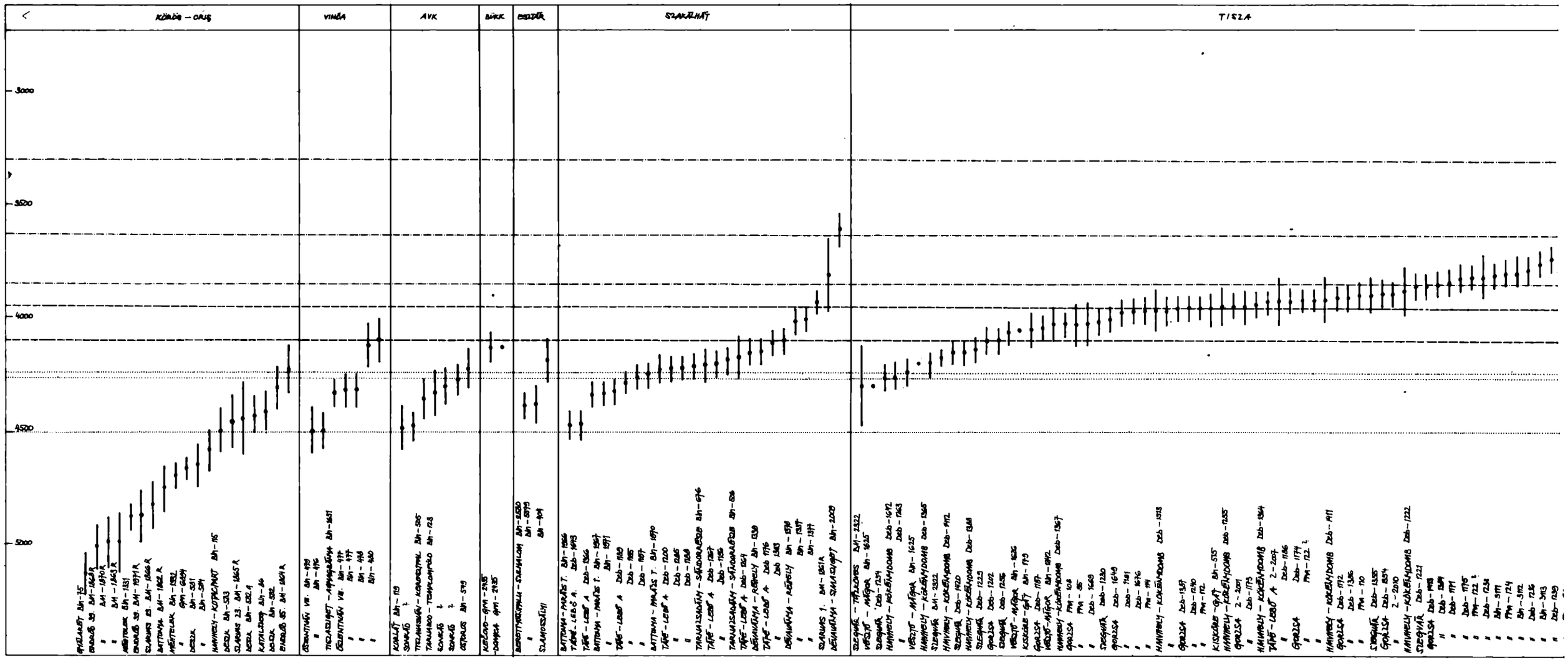

FIG. 4

N NEOLITHIC CULTURES (BP-1950)

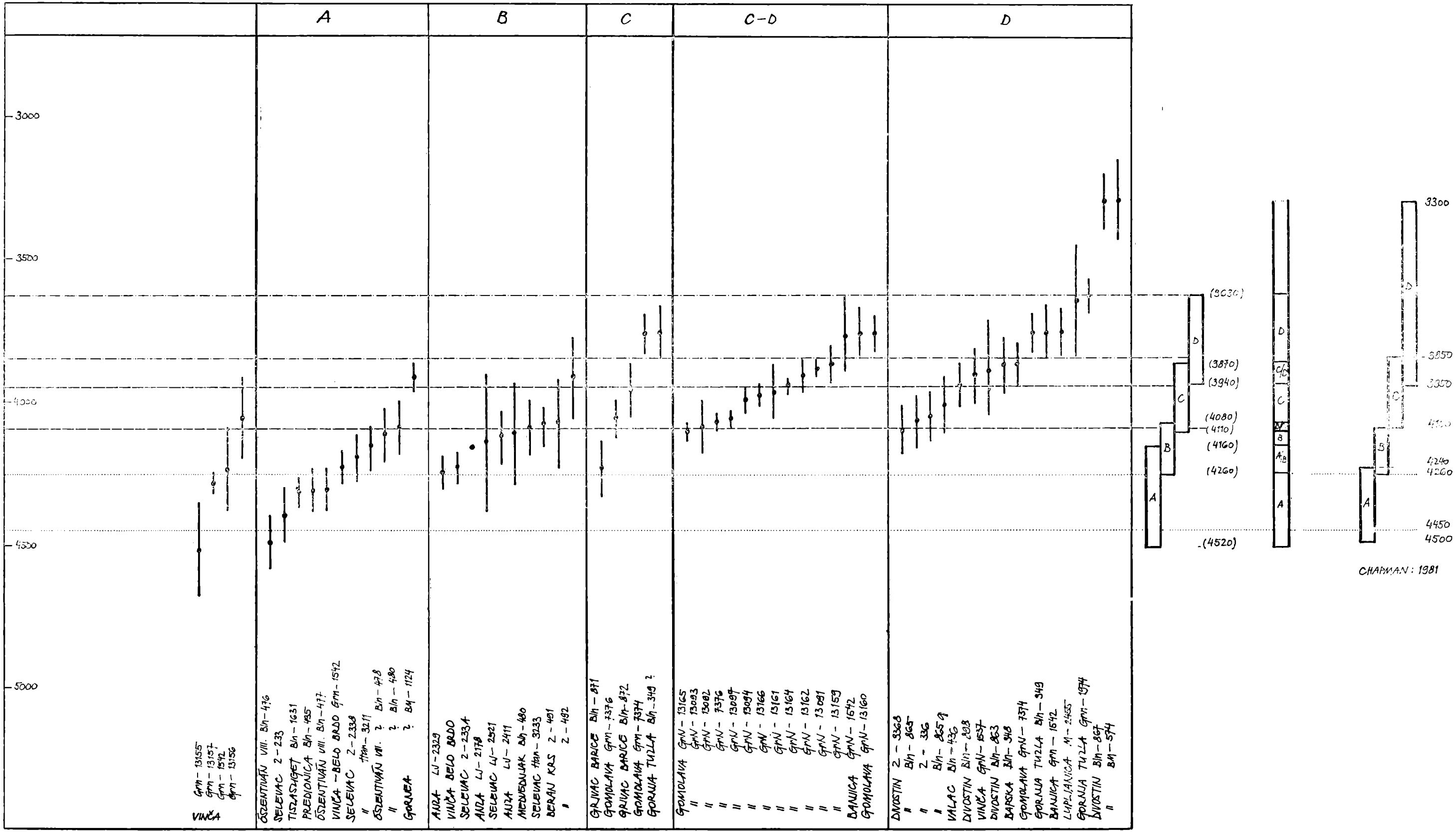

Fig. 3.

C 14 dates presently known from the South-East Hungarian Early Neolithic Körös Culture fit to the frame of the traditional relative chronology in the same way as the previous research placed it in the neolithic sequence on the basis of traditional cross-dating system (Fig. 4). In the majority of cases these dates preceede the Vinča A-period and run parallel with the Karanovo I-II Cultures. Dates which deviate from the traditional relative chronology are those which fall into the Vinča A-period and, with the standard deviation two dates (Deszk-Olajkút, Bln.-582 and Endrőd, site Nr. 35, BM-1864R) fall into the Vinča B-period. Atthough on both of these sites the late period of the Körös Culture is represented, such a long island-like survival of this is not likely. The samples probably date a later settling of other cultures present on both sites.[9] Further on we do not explain one by one the data which stick out over the values of the standard deviation from the series, in Fig. 5. the hatched columns mean sufficiant base for precise chronological conclusions.)

Data of the Körös Culture parallel to the Vinča A-dates sign the chronological position of the latest phase of this culture (Körös IV, earlier Proto-Vinca Phase)[10], even in cases when the typological classification of the artefacts basically contradicts to this (the Körös finds of site Nr. 23 Szarvas are regarded as the early phase of the culture for example).[11] This is a contradiction between the subjective (archaeological) and natural scientific based interpretation. These questions have to be revised when the detailed inner chronology of the Körös Culture is worked out.

The series of C 14 dates referring to the Alföld Linear Pottery Culture (ALPC) is, although small, is extremely important, because data of the earliest ALPC (ALPC 1, earlier Szatmár II) and those of Tiszadob group ones — formely held to be the follower of the ALPC 1 — completely overlap each other. If the samples of the C 14 date were collected from authentic positions this parallelism needs more attention especially in connection with the question of the emergence of ALPC. Only new authentic excavations and great series of C 14 dates can be the base of the statement to say that the formation of the Central European Linear Pottery Culture (CELPC) took place in the area of the Duna-Tisza region. Already H. Quitta defined the emergence of the CELPC around 4600 BC in his study on the basis of the first C 14 measurements in 1967.[12] New data of Eitzum and Eilsleben between 4530—4945 BC

[9] QUITTA, H.—KOHL, G. 1969, 240; *Magyarország Régészeti Topográfiája* (in the followings: MRT) 8, 142.

[10] RACZKY, P. 1988, 29 and fig. 37.

[11] MRT 8, 396.

[12] QUITTA, H. 1967, 264 and fig. 1.

also have preceeded the time of the beginning of Vinča A-period and, the oldest date of CELPC nearly half a millenia earlier than the first (oldest) date of ALPC (Korlát).[13] Contrary to this, there is no one date of the ALPC that preceeds the beginning of Vinča A-period. This interconnection is quite clear even by archaeological analyses, however. The Szatmár II-group on the Upper Tisza-region cannot be the immediate antecedent of ALPC as it was held earlier, but the first stage of that, parallel to Vinča A-period and to the emergence of the Transdanubian LPC (TLPC, Bicske-Becsehely-Biňa-Hurbanovo-Nitra).[14] If we do not regard the earliest few data of CELPC, but only the majority of the dates, it is not questionable that LPC had to exist as early as the very beginning of Vinča A-period. Even logically it is impossibile that the formation of LPC might have occured in Transdanubia or in the Upper Tisza-region contemporarily with Vinča A-period. Even logically it is impossibile that the formation of LPC might have occured in Transdanubia or in the Upper Tisza-region contemporarily with Vinča A—Dudești I—Karanovo III—Protokakanj (Kakanj)—Danilo I, because in this case this culture ought to have spread at the same time in Slovakia, Lower-Austria and Southern-Germany. Unfortunately only a few, but contemporaneous, or somewhat later dates are known from Moldavian LPC than dates of Vinča A.[15] In the light of these new aspects those arguments give a new meaning which emphasized the parallelism between the Körös—Starčevo and LPC during the sixties and early seventies.[16] The very same can be said about the inevitably early LPC sherds which appeared in a Körös pit at Gyálarét—Szilágyi major, in the excavation of O. Trogmayer. The artefacts of the site surely belong to an earlier phase of the culture than the Maroslele—Pana pit Nr. 3, that is Vinča A-ALPC 1 (earlier Szatmár II) and Dévaványa—Atyaszeg, Öcsöd—Kiritó (earlier Protovinča) horizon. According to O. Trogmayers' chronology based on the ratio of the barbotine-ornament, Gyálerét is the earliest Körös site in the Szeged region. It is supported by one C 14 date too: 5140 BC.[17]
The number of C 14 dates of TLPC is not enough for making an even rough frame of radiocarbon chronology up to now. It is surprising, that the existing data (Zalavár, Kustánszeg) fall togethen with Vinča B-time.

One of the most remarkable new results of the radiocarbon chronolagy in contrary to the traditionally based relative chronological system

[13] KAUFMANN, D. 1983, 193; SCHWARZ-MACKENSEN. G. 1985, 26. KOHL, G.—QUITTA, H. 1964.

[14] RACZKY, P. 1988, 27.

[15] DUMITRESCU, H. 1974. 38; ELLIS, L. 1984, 21.

[16] TROGMAYER, O. 1967, 35—40; 1968, 5—9; 1972, 71—76; LICHARDUS, J. 1972; 1—15; PAVÚK, J. 1976, 33—43; 1980. 163—174.

[17] KOHL, G.—QUITTA, H. 1963, 299—300; Radiocarbon 1964, 315.

refers to the Middle and Late Neolithic of the region between the valleys of Tisza and Maros. The earlier part of the series of the data from the sites of the early Szakálhát Culture fall inevitably within the time of the Vinča A-period (Tápé—Lebő-A, Battonya—Parázs tanya, 8 dates).[18] These dates are parallel with those of Tiszadob, Korlát, Tiszavasvári—Keresztfal, Tiszavasvári—Templomföld and Sonkád ones. The latter was defined as ALPC 2 site by P. Raczky, which is yet within Vinča A-period, according to his chronology.[19] Naturally he does not understand a Szakálhát—Tiszadob—Sonkád parallelism by it. The situation is similar with the Esztár group too. The two data of Berettyóújfalu—Szilhalom fall within the Vinča A-period, even if we take into consoderation only the top values of the standard deviations. It is important that Szakálhát—Esztár, Szakálhát—Vinča A, Esztár—Vinča A, Tiszadob—Early ALPC, Esztár—Late ALPC, Esztár—Tiszadob, Tiszadob—Vinča A — ALPC 2 — relations can be found in the newer archaeological material, too.[20] The real chronological relations between these archaeological units can hardly be established in detail even despite the archaelogical interconnections and the C 14 dates mentioned above. The main cause of the present difficulties is as follows:

1. The total of 25 dates shows that these units only energed within Vinča A-period (11 dates) and, survived in Vinča B too (14 dates) — because of the interval of the standard deviation.

2. In the key materials of Berettyószentmárton-Morotva and Tiszalök-Hajnalos of the Esztár and Tiszadob group there are character of artefacts reflecting both Vinča A—B and C-period characteristics, partly published.[21] These facts raise the suspicion that both sites contained three settlement phases or two or three independent settlements. The question is, which phase or settlements the named groups belonged to. This question can be answered so only on the basis of new authentic stratigraphical observations combined with properly taken C 14 samples.

In the case of the Tisza Culture, the earliest dates from Szegvár—Tűzköves, Hódmezővásárhely—Kökény-domb and Vésztő—Mágor fall within the end of Vinča A-period. From the total of 78 dates from Tisza Culture it is only 4 dates with their standard deviation falling into the period of Vinča B1 and B2. As we could see the method of correcting the place of measured samples beeing in contradiction with the stratigraphical position in these cases the top value of deviation is acceptable referring to the start of early Tisza Culture i.e. end of Vinča B_1 — beginning of

[18] HERTELENDI, E.—HORVÁTH, F. In press.

[19] RACZKY, P. 1988, 29—30.

[20] SZÉNÁSZKY G. J. 1983. 243; MÁTHÉ, M. 1979, T. VII. Uppermost fig. on the left; KURUCZ, K. 1989, 36; GOLDMAN, GY. 1983, 26—33; TROGMAYER, O. 1980, 299—301.

[21] MÁTHÉ, M. 1979, T.V. Uppermost fig. on the right. Tiszalök-Hajnalos: I am indebted to Katalin KURUCZ, who gave the possibility for me to study the complete finds of the excavation.

Vinča B_2. The settlement layers from which the dated samples have came from in each of the cases contained Early Tisza pottery (earlier named as late Szakálhát, or Szakálhát—Tisza transitional period). This relation drew our attention to the fact that the formation of the pottery style of the Tisza Culture in these sites stared at a very early date and, with a changed, altered form and decoration of the pottery however, these settlement layers were contemporaneous even despite the existing differences in the pottery with the other surrounding settlements which used the developed, or classical Szakálhát Style. In one word: the settlements of the developed Szakálhát Culture and that of the Early (formating) Tisza Culture ones were contemporaneous, within the Vinča B-period. The early Tisza development had started only in the case of few Szakálhát settlements, however, in the same way as the developed (classical) Tisza Culture came into beeing only at certain few settlements (in this sence I mean the central settlements, not all the less Szakálhát and Tisza sites, which topographically can be registered (namely Csóka, Szegvár, Hódmezővásárhely—Kökénydomb. Öcsöd etc. At the other settlements — in the first place it is characteristic for Békés County and its immediate surroundings — the stylistical characteristics of the emergeing Tisza Culture survived during the developed (classical) Tisza time in the region of the river Tisza quite parallel to the Vinča C-period. A seeming contradiction derives from the fact that the C 14 dates of some Szakálhát site in Békés County (Dévaványa—Réhely and Dévaványa—Simasziget) are parallel in time with those of the sites of the Tisza Culture that used the Classical Style of pottery. (The differences in the detailes of this settlement are naturally more numerous in settlement features, type of certain artefacts, house types, burials, etc., but the main reason why terminology was established was the style of the pottery, which is only a part of the whole culture, but really reflects the changes which took place in the whole culture.) These differences refer only to the style of the pottery — and so to the terminology — however, in spite of the chronological contemporaneity. In the case of sites with these young dates which were held earlier as inevitably Szakálhát (or Late Szakálhát), we can very probably see the longermost survival of the retarding pottery style of the emergeing Tisza Culture. In no period of time can we speak about a uniquely characteristic cultural entity of the whole Alföld area, because, the direction and speed of the development were different in rate and results by settlement or rather by sub/regions. Because of the above reasons the development of the Late Neolithic in the Southern Tisza Region looks to be more various than it was thought earlier. While in the Békés region the traditions of the Late Szakálhát—Emergeing Tisza Culture survive, along the river Tisza and east of it the so-called classical Tisza style appears, in the Southern margin of which contemporary with both of them the Gorzsa Group took the role in the earlier Szakálhát and originally Vinča area which emerged with a contribution of different Vinča C-elements (Gorzsa, Lebő-A, Deszk, Sándorfalva, Ószentiván III, Oroszlámos (Banatszkog Arandeloba, Hodoni, etc.) since the time of the beginning of Vinča C-changes.[22] On the base of the C 14 dates the period of the Proto-Tiszapolgár Culture characteristic to the 5th level of Herpály and

[22] See note 1; MOGA, M.—RADU, O. 1977; DRAŞOVEAN. F. 1991;

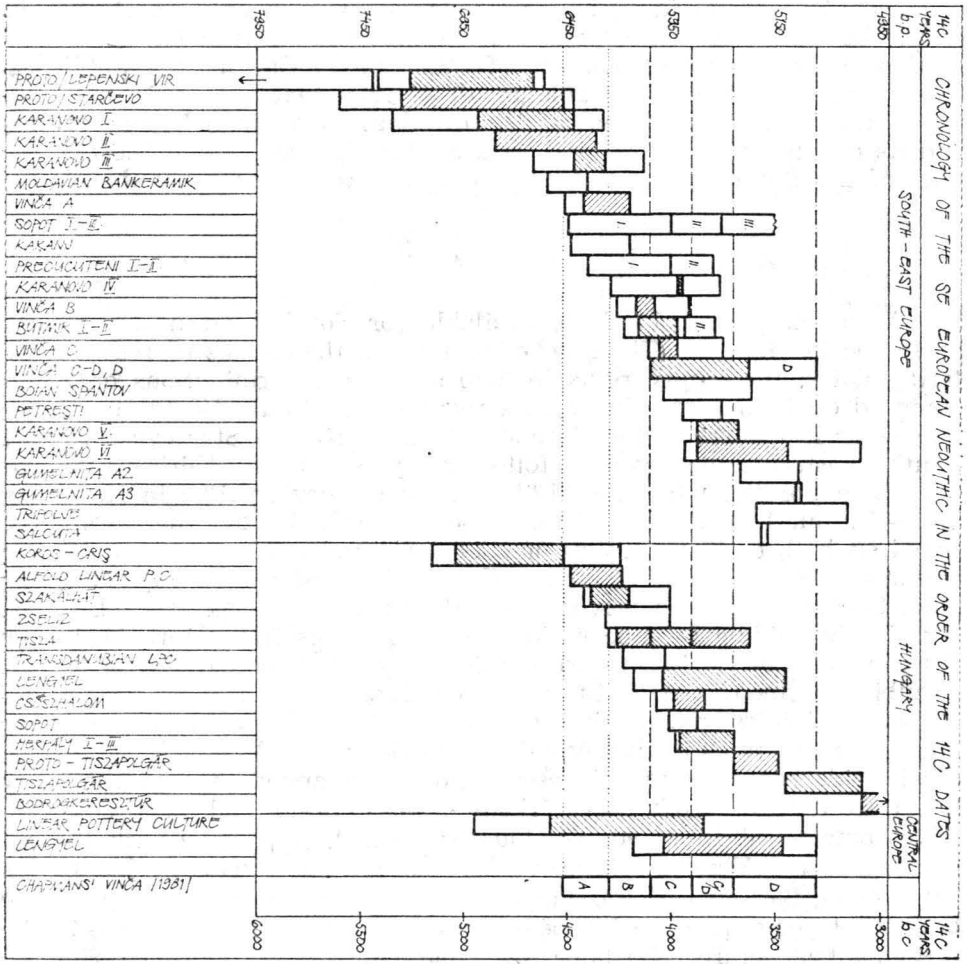

Fig. 5.

clearly appears in the phase A-of Gorzsa can be defined clearly. When comparing the dates of the two mentioned sites to the data of Bélmegyer—Mondoki—Domb and Méhkerék, two Proto-Tiszapolgár groups can be separated in time before and after 3500 BC. The data of the later period is interlapped in time by one date of the series from Tiszapolgár—Bastanya, of which a sample has been taken from a grave belonging to the Early Tiszapolgár period (A).[23] This period lately was ranged to the Proto—Tiszapolgár phase by N. Kalicz and P. Raczky.[24] The data of the Proto—Tiszapolgár period cluster around the turn of the Vinča D1-D2 periods.

[23] BOGNÁR-KUTZIÁN, I. 198, 294.
[24] KALICZ, N.—RACZKY, P. 1984, 133.

From Transdanubia we have an appreciable series only since the time of the beginning of the Lengyel Culture. Because of the lack of information referring to which phase of the Lengyel Culture the published dates belong to, the only stable result of it is that the beginning falls inside the Vinča C, and that of the developed (classical) Tisza Culture, and its end is around the final dates of the Tiszapolgár and the earliest ones of the Bodrogkeresztúr Cultures in the area of Transdanubia.

SUMMARY

A summary of C 14 dates available for South-Eastern Europe are presented in Figure 5. (The hatched sections of the colums represent clustering dates, the empty parts include sporadic determinations only. No standard deviations are shown). As regards the Middle Neolithic foregoings — as it appears — the Karanovo I—II — Körös—Starčevo period in South—Eastern Hungary was followed by a surving Körös—Starčevo period, in parallel with the Alföld Linear Pottery (ALPC) in Karanovo III — Butmir I — Vinča A-time. These connections prove the chronology based on both earlier analyses of C 14 dates and the latest results of the archaeological cross-dating method.[25] The increasing quantity of dates from Central Europe, however, make the primary emergence of LP Culture in the middle Danube region doubtful. Dates from Moravia, Lower Austria and Lower Saxony are considerably older than those for Transdanubia or for the ALP Culture. The dates from Tápé—Lebő-A and Battonya—Parázstanya make it probable that the Szakálhát Culture emerged as early as in the second part of the Vinča A-period. Archaeological evidences support this assumption. The appearance of the early Tisza Culture at Hódmezővásárhely—Kökénydomb and Szegvár—Tűzköves between 6210—6190 BP (4300—4240 BC), in parallel with the beginning of the Vinča B-phase needs more attention. This period marks the end of Battonya—Parázstanya (site of the early Szakálhát Culture) and, the layer sequence of Tápé—Lebő-A shows a definite change in the settlement structure. The later Szakálhát phase dates, however, run parallel with the early Tisza ones inside the Vinča B-period. It appears from this synchronism, that most of the Szakálhát sites are contemporaneous with the early Tisza period, i.e. both the Szakálhát and the Tisza took place gradually within the span of the Vinča B-period. If we compare these changes with those in the Balkan series, we can see that it coincides with the beginning of Karanovo IV at Sitagroi II. On the basis of our new C 14 measurements we are able to define the beginning of the middle (classical) period of the Tisza Culture at around 6050 BP (4100 BC, 4975 cal. BC*) and its end at 5800 BP (3850 BC, 4776-4594 cal. BC*). The first date coincides with the beginning of the Vinča C and the Gomolava Ia phases, while the latter date marks the end of this perioda at every examined site representing this period of the Tisza Culture. This horizon is identical with the beginning of Vinča D1 and Karanovo VI (Azmak). The time span of the Gorzsa Group is between 6050

[25] QUITTA, H. 1967, RACZKY, P. 1988, Fig. 37.

BP (4100 BC., 4975 cal. BC*) and 5530 BP) 3580 BC., 4430 cal. BC)* running in parallel with the Csőszhalom Group in the northern Tisza region. Its end is contemporaneous with Tripolje AII — Precucuteni III (Novye Rusesty) and with the last reliable date of the Vinča D1 Culture from Gornja Tuzla.

As a summary I should like to emphasise the conclusion: for the reliable basis of prehistoric chronology we need

1, very detailed level-by-level system of finestratigraphic excavations,

2, correction of great series of radiocarbon dates by individual sites in the way I presented it just now,

3, the revision of cross dating system on the basis of the former two aspects.[26]

LITERATURE

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[26] In this paper we deal with uncalibrated radiocarbon dates (BP) or the same value — 1950 (BC) as selfstanding relative chronologycal values, regardless to the true age, becouse of the present difficulties of different calibration curves (see: OTTAWAY, B. 1986). In few cases the calibration used (cal BP, cal BC) according to Pearson et al* (1986) using a computer program of Plicht and Mook (1989), or according to Clark* (1975). In a more detailed study beeing in preparation we are going to deal with South East European radiocarbon dates according to different calibration curves too.

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