

THE BAND POTTERY CULTURE AND THE CORDED WARE CULTURE THE TWO - ADAPTATIONAL MODELS FROM CENTRAL EUROPE

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1. INTRODUCTION

The Neolithic in Central Europe is characterized by considerable differences in archaeological cultures. Analyzing their differentiation from the point of view of economic phenomena, one can distinguish two main kinds of cultures. The first one included archaeological cultures characterized by the dominant role of agriculture in the economic system. The other strategy was characterized by more varied economic behaviour, with agriculture playing a less important role in providing the group's mean of living.

The subject of this paper is two Neolithic populations belonging to two cultures from Central Europe : the Band Pottery Culture (BPC) and the Corded Ware Culture (CWC). They present two opposite culture strategies. Separation of these strategies does not of course imply that they are the only ones in the whole Neolithic in Central Europe.

An efficient field of studies within which relations between biological and cultural factors can be analysed seems to be ecology. Application of a common theoretical background makes it possible to use paleodemographic values and morphological data for an attempt at explanation of certain economic and ecological aspects of each of the culture strategies.

The development of paleodemography in the last twenty years has brought significant results for prehistory (e.g. Jackes 1992, Marciniak 1993b). For archaeologists one of the most interesting aspects of such studies is their application to the interpretation of ecological and economic processes in prehistory.

An ecological description of a human group includes the following information :

- 1) information about the structure and the productivity of the economy,
- 2) information about the state and the dynamics of the population (demographic characteristic),
- 3) information about the relationship between the human group and its natural environment (morphological structure of the group).

These three aspects of the ecological description will be analysed for the Band Pottery Culture and the Corded Ware Culture.

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2. ECONOMIC-ECOLOGICAL CHARACTERISTICS

Populations of Band Pottery Culture were the first agricultural communities in the area of Central Europe. These groups represent a homogeneous socio-cultural system, formed and undergoing transformations in the zone (in the sense of ecological zones) spread of an agricultural economy from the "Near East centre". The system, understood in such a way, was a result of adaptation of a Near Eastern model of agriculture to qualitatively new conditions in the zone of temperate climate in Central Europe (Czerniak 1983 : 141).

The essence of the colonization, and within it the character of the economy itself constituted the introduction, on the wider scale, the plant cultivation of foreign origin. As far as we know any of the local wild plants has not been introduced to the agricultural repertoire of the early farmers. While the plant cultivation was the most important agricultural occupation, the animal husbandary can be regarded as an additional one. The husbandary provided the biggest quantity of animal protein. The way of cultivation caused the settled character of these groups and that is why the breeding should have had mainly stationary, homebased character and the areas of pasturage were closely related to the settlement. The range of flexibility of the whole system was limited. This resulted from a technological uniformity based on Near East components which were not fully adapted to the local environmental conditions (Tabaczyński 1970 : 312 ; Hensel, Tabaczyński 1978 : 138).

The Corded Ware Culture is the most important culture at the end of the Neolithic in Central Europe. Although the genesis of Corded Ware Culture is a subject of wide discussion and many controversies, most archaeologists agree that this cultural complex was rooted in the large scale economic and social changes probably on the basis of external influence (migration) from the steppe region (e.g. Gimbutas 1977). The Corded Ware Culture spread in agreement with local conditions and created a large variety of cultural mixes (Kristiansen 1989 : 215). A greater environmental tolerance is characteristic of the CWC system. Specialization of specific human groups in this culture is clear, and the character of the economy in the specific areas is different.

The basis of the economy of these populations in the Vistula and Odra rivers region was a moving husbandary, mainly of cattle, goats and sheep in a definite region, mainly in the grassy areas and rich forest habitats. The main regions of exploitation were the higher parts of plateaux and permanent settlements were almost unknown (Wiślański 1969 : 87 ; Kruk 1973 : 190, 1980 : 317-333). This system corresponded very well to existing natural environment of that period - a big tracts of the steppe landscape. The herd was grassing on the plateaux shifting lineary to the new territories keeping the main rivers as axes. Such a nomadic husbandary seemed to have been very effective.

On the other hand, in the area of Saxony and Thuringia (Germany), the Corded Ware Culture groups conducted a mixed economy, and field cultivation and the breeding of domesticated animals were undoubtedly known (Feustel,

Bach, Gall, Teichert 1966 : 119 ; Behrens 1971 : 81). The only exception within all CWC they were large settlements here with permanent buildings, proves the long-term occupation. The CWC settled the same fertile soils (loesses) which were earlier settled by BPC. In the light of many observations it is thought that agricultural occupations prevailed in the general balance of economic activities. The materials of the CWC from the territory of Thuringia and Saxony allowed to break the traditional treatment of the culture as a pure nomadic culture. As I tried to prove above, the Saxony and Thuringia groups were characterized by considerable importance of plant cultivation with animal husbandry as an additional occupation. The very stable character of settlement shows that these groups can be regarded, to some extent, as a continuators of the traditional Neolithic economy started by the BPC.

The third important zone of settlement of CWC groups is the area of Bohemia and Moravia. The CWC on this territory is known mainly from the grave materials. Similar as in the territory of Odra-Vistula rivers the settlements are almost unknown, however vast majority of known sites is located on the very rich soils as loesses and moulds. It seems that these groups were characterized by a mixed economy, but a nomadic style of life was practised (mainly in the older stage), with husbandry as the basic economic occupation. Land cultivation was known, but only to a small degree (Buchvaldek 1967 : 121-23; Neustupný 1969 : 43-68).

3. PALEODEMOGRAPHIC PARAMETERS

Every paleodemographic analysis refers to a description of the state, i.e. intensity of a phenomenon, its structure or relations with other phenomena and the evaluation of changes occurring to the given phenomenon in the course of time. Evaluation of the biological state is an expression of adaptation understood as the biological and cultural characteristics which make the reproductive success of a group possible. Paleodemography is understood here as a science studying the state, biological dynamics and size of human groups as well as their distribution on the basis of archaeological sources.

The most reliable and valuable information concerning the structure of mortality is obtained from the scheme of mortality of adult individuals. It is synthetically described by one of the parameters from the death tables the $e^{\circ}20$. This parameter defines how many years a 20 years old individual may survive and it describes briefly the demographic situation of the group.

Of similar cognitive value is the coefficient of potential reproduction (R_{pot}) which is used for the evaluation of the biological state and dynamics. This coefficient measures the probability of restricting the reproductive ability of a group because of the mortality of adult individuals (Henneberg 1975). It measures synthetically the reproductive success of a group in given environmental conditions. For its calculation one needs two variables : the reconstructed variable, i.e. structure of mortality, established on the basis of succession of death in particular age categories, and the model variable, i.e. structure of fertility.

For those two culture adaptive strategies (Band Pottery Culture and Corded Ware Culture) the demographic situation, i.e. the biological state and the population dynamics, have been studied using the coefficient of potential reproduction R_{pot} and parameter e_{20} . As a result of the Neolithic materials being scarce, and requirements of statistical analysis, only four series of BPC and five series of CWC populations were used (cf. Marciniak 1993a : 146, tab.1). More exact analysis of this kind is impossible due to lack of appropriate materials.

The following average results were obtained (arithmetic means for all the series) :

1) Band Pottery Culture :

$R_{pot} = 0.597$, standard deviation $s=0.017$;

$e_{20} = 17.6$, $s=0.78$,

2) Corded Ware Culture :

$R_{pot} = 0.636$, $s=0.108$;

$e_{20} = 18.3$, $s=5.25$.

As we see the values of all BPC series are very similar. Homogeneity of this complex is very characteristic, and differences within the whole system seems to be very small as it is seen in low values of standard deviation. The arithmetic means obtained for the whole Corded Ware Culture do not reflect the real values of these measures in particular series. This is indicated by the very high values of the standard deviation (s). The values oscillate for R_{pot} from 0.75 for the area of the Vistula and the Odra rivers, through 0.61 for Bohemia and Moravia and 0.45 for Saxony and Thuringia ; e_{20} 23.5, 17.5, 9.3, respectively. The value of measures for the series depends more on the area (region) from which they come than on the archaeological culture. The series of CWC populations, in terms of the demographic situation, is highly heterogeneous, and there exist very significant interregional differences (e.g. Marciniak 1993a : 146). Values of these parameters in both cultures are relatively low in the context of all prehistory and there are situated at the beginning of the exponential curve showing the increase of these parameters in the course of time.

4. MORPHOLOGICAL STRUCTURE

The differentiation of the morphological structure was investigated on the basis of 10 traits of the skull (g-op, eu-eu, ft-ft, ba-b, zy-zy, n-pr, mf-ek, o.h., ap. pirif, n-ns) Two multivariation methods were used : Penrose's biological distances and principal components analysis for all available anthropological materials from two analysed cultures from Central Europe.

Fig.1 illustrates the biological differentiation of the populations belonging to the BPC and fig.2 illustrates populations of the CWC living in different geographical regions (matrices of Penrose distances from Piontek, Marciniak 1990 : 42-43, tab. 9,10).

The dendrograms show that these two populations are characterized close biological similarity. The factor which shaped their morphological differentiation was then informative cultural heritage demonstrated by the fact belonging to a given archaeological culture. The above conclusion is also confirmed by the analysis of the dendrograms illustrating the structures of morphological similarities of all series from Central Europe (cf. Piontek, Marciniak 1990 : 51, fig.18). In case of all dendrograms, populations belonging to the same archaeological cultures, have close morphological similarities.

The method of the principal components analysis was also used for the analysis of the differentiation of the biological structure of the populations.

Fig.3 illustrates the values of first and second principal components for the populations representing the following archaeological cultures : the Linear Band Pottery Culture, the Corded Ware Culture and also the Bell Beaker Culture (BBC), Tripolje Culture (TC) and Dnepro Donec Culture (DDC) (coefficients of all populations in the arrangement of four principal components are published in Piontek, Marciniak 1992 : 84, tab. 17). Populations from these cultures are marked by a high degree of similarity of their systems and they are also similar morphologically. Bell Beaker populations formed themselves into a separate group with a specific morphological structure. Some similarity of morphological structures of the BPC and CWC populations is probably due to close biological and cultural ties (in the regional sense). It should be stressed that CWC populations from Bohemia and Moravia and from the Elbe Saale basin form a separate group and are very different from the Band Pottery Culture populations. The CWC populations exhibiting Poland posses morphological characteristics more ressembling those of the BPC populations.

The analysis of the morphological differentiation using Penrose's method and the principal component analysis shown that there exists a strong connection between the structure of biological variability and the structure of cultural differentiation.

5. DISCUSSION

The analysis conducted in this work qualifies us to assume that the biological structure of a group remains in feedback with its technological equipment and cultural transformations are reflected in biological and demographic phenomena (Wierciński 1983 : 252). Favourable living conditions bring an improvement in the population's standard of living (better nutrition and health conditions) which is manifested in the increasing demographic indicators. On the other hand, a global decline in the condition of a given group causes the lowering of its demographic potential. In this connection the complementary explanation of elements of the same biocultural system, in this case the culture adaptive strategies of Neolithic populations from Central Europe, becomes possible.

Populations of the Band Pottery Culture were characterized by very similar and relatively low demographic indicators irrespective of variation in the natural environment (climatic and geographic) in which they lived. They formed themselves as a cultural community equipped with a unified information system, economy, system of exploitation of resources and ecological niches chosen. They were characterized by small differentiation of social and ideological structure, small differentiation of artifacts. Information accumulated in this system made possible only limited variation within a definite manner of production and obtaining food. Keeping to the economic rules, must have gradually led to a fall in economic effectiveness and to changes in the whole system. The economic system realized by these populations was highly inefficient in the new natural and cultural environment of temperate Europe. The homogeneous economy, involving a similar conditions of life, resulted in demographic coefficients characterized by similar values. In turn, the character of economic activities preferred by BPC populations, originating under different ecological conditions, could not be fully realized in the new areas in Central Europe as it is seen in the low values of these coefficients.

The Corded Ware Culture populations, whose cultural system was considerably more differentiated than that of the BPC populations, presents a different adaptive model. Values for paleodemographic indicators also have a wide range of variability. In this model, decisive significance is ascribed to the economic and technological factors which allow more varied oecumenical exploitation. Economic activities of particular groups were considerably differentiated, albeit with a dominant role of husbandary, but with the preservation of strong inter-group cooperation which is indicated by the similarity of morphological structure. Morphological analysis of groups of the Corded Ware Culture seems to suggest their peculiar character compared with other Neolithic populations. The CWC was characterized not only by a compact cultural and social framework but also by a similar morphological structure.

Taking into account the research value ascribed to the R_{pot} coefficient one can conclude that the most efficient economy characterized the CWC groups from the area of the Vistula and the Odra rivers, involving animal husbandary with an insignificant presence of plant cultivation. This would be more efficient than the agricultural economy from the region of Saxony and Thuringia. Higher values of both indices in the regions with a dominance of husbandary suggest better living conditions for those population probably due to a dominance of milk and meat products. The similar suggestion based on dental features has been presented lately by Kristiansen (1989 : 217). This economic model seems to have been the most appropriate in the given environmental and climatic conditions. A number of the observations indicate that climate in Central Europe from the beginning of the third millennium became colder and wetter. That were a climatic changes which shifted economic behaviour into the grazing of more marginal soils as we see e.g., in the Vistula Basin.

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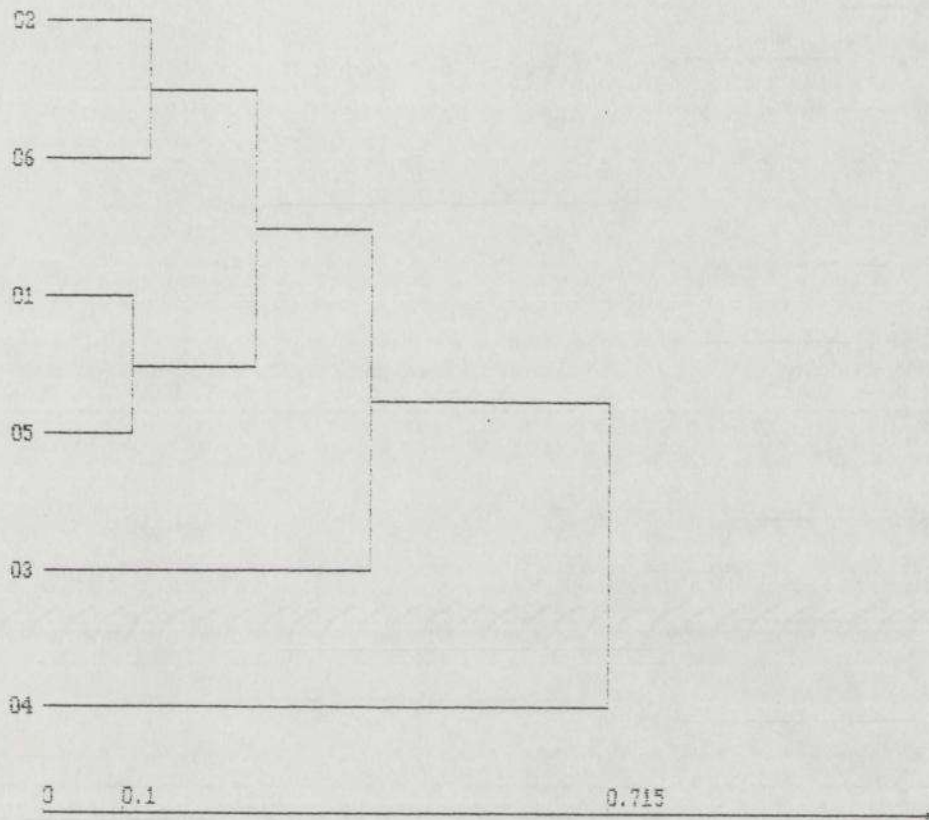


Fig. 1 : Dendrogram arranging the differentiation of the Band Pottery Culture populations from Central Europe.

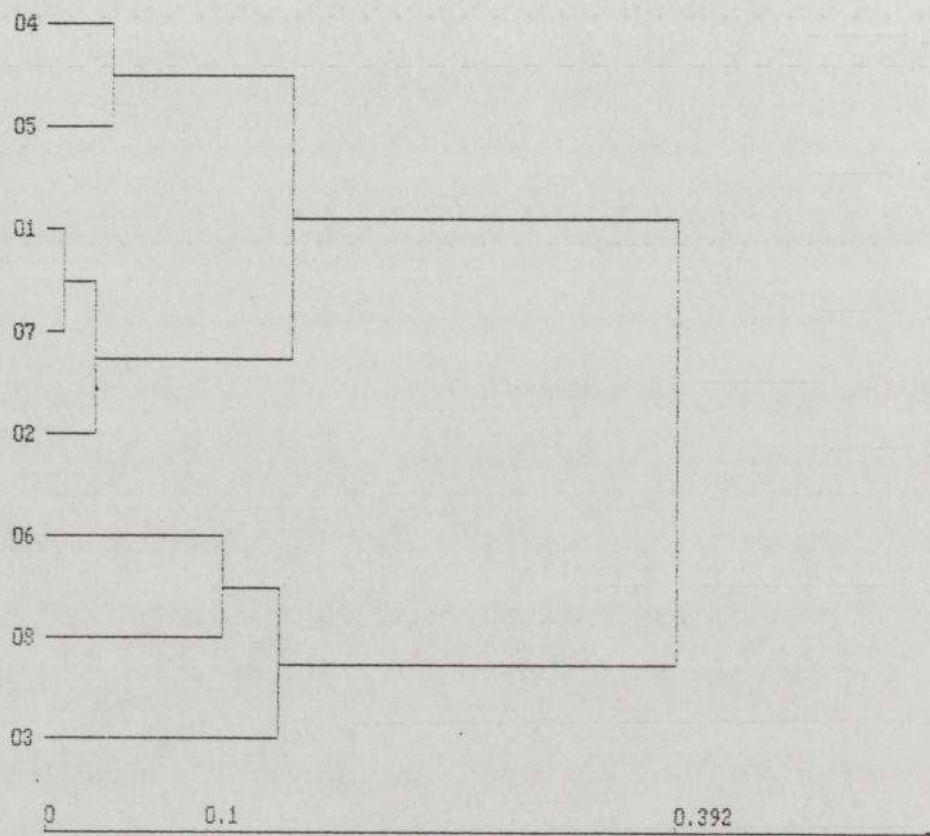


Fig. 2 : Dendrogram arranging the differentiation of the Corded Ware Culture populations from Central Europe.

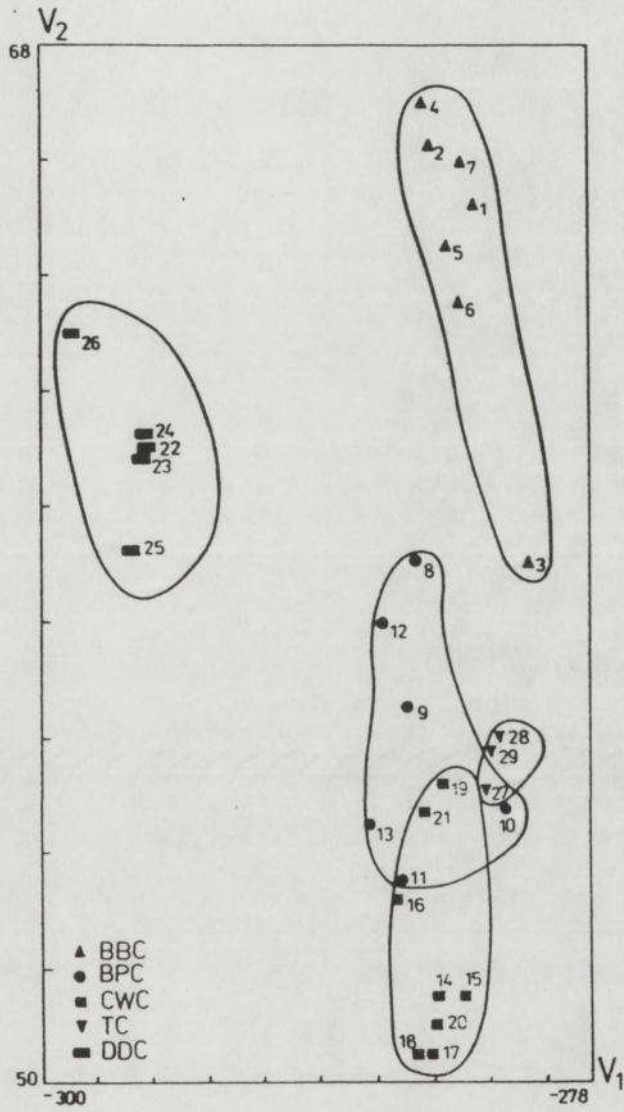


Fig. 3 : Distribution of groups from different parts of Central Europe described by the first and the second principal component.