

## THE STRATIGRAPHY AND THE ENVIRONMENT RECONSTRUCTION OF THE MIDDLE PALAEOLITHIC SITES IN POLAND

by

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The sites of the Middle Palaeolithic in Poland are concentrated mainly in the Cracow Upland. The stratigraphy of the sites is based on the palaeoclimatic interpretation of the sedimentary sequence and on the analysis of fossil fauna according to the assemblage differentiation reflecting the environment changes.

The persistence of the Middle Palaeolithic cultures in Poland started with the end of the Penultimate Glaciation and terminated with the beginning of the first Vistulian coldness maximum, it means the Older Pleni - Vistulian, when a gap in human occupation becomes apparent.

The oldest Middle Palaeolithic assemblages characteristic by levalloisian technique were documented in the Nietoperzowa Cave (CHMIELEWSKI, 1961; MADEYSKA, 1982). Synchronous cultural materials were found in Ciemna Cave and Piekary (KRUKOWSKI, 1939-1948; MORAWSKI, 1975). Younger materials of similar culture were found in the Early Vistulian sediments of some caves (MADEYSKA-NIKLEWSKA, 1969a, 1979).

A few Levallois-Mousterian assemblages were discovered at the Zwierzyniec site (CHMIELEWSKI *et al.*, 1977). The oldest one was found in stratified river sands altered by soil processes into the illuvial horizon of the lessivé interglacial soil, whilst the younger materials were found in the upper part of the soil.

A distinct group of the Middle Palaeolithic consists of industries with hand-axes. Among them J.K. KOZLOWSKI and S.K. KOZLOWSKI (1977) distinguished assemblages of the Bockstein, of the Ciemna and of the Wylotne type. These three groups W. CHMIELEWSKI (1969, 1975) united into one Micoquo - Prondnikian culture that shows the evolution observable during the whole Early Vistulian. The main sites are the Wylotne Rock Shelter and the Ciemna Cave. The youngest assemblage of that culture is known from the Ciemna Cave, where it is contemporaneous with the beginning of loess sedimentation of the Older Pleni-Vistulian (MADEYSKA-NIKLEWSKA, 1969b).

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As another culture of the Mousterian Complex, the South-East Charentian was distinguished from the Raj Cave in the Holy Cross Mountains (Studies ..., 1972), dated back to the younger part of the Early Vistulian.

The cold climatic conditions of the Penultimate Glaciation is documented in the oldest part of the Nietoperzowa Cave sediments by an angular limestone rubble and by the presence of loessic material.

The interglacial sediments in caves compose of the residual weathering reddish clays with humus and rounded, strongly chemically weathered, porous limestone rubble, partly covered by a crust of phosphate minerals. These features evidence climatic conditions warmer than the recent ones. The synchronous formation of the lessivé soil on the Zwierzyniec site indicates the presence of deciduous or mixed forest.

The Early Vistulian cave sediments are characteristic by diminishing of the intensity of chemical weathering with fluctuations, showing two or three phases of climatic ameliorations. In the Zwierzyniec site, the presence of charcoals in the upper part of the soil testifies to transferring the deciduous forest to the coniferous one. Then, the gleization and development of slope processes evidence humid conditions.

An important information is given by the Mammalian fauna. In the layers dated to the end of Penultimate Glaciation, tundra species are present with lemmings, than the silvan element appears (*Meles meles*, *Ursus cf. arctos*, *Felis silvestris*, *Apodemus sylvaticus*) increasing in number and associated with steppe forms (*Equus caballus*, *Ochotona pusilla*). In the interglacial layers silvan element reaches 30 % of species.

In the Early Vistulian sediments the silvan element became reduced to 8-20 % of species. It coexisted with all other ecological groups - tundra (lemmings, *Microtus gregalis*, *Lepus timidus*, *Mammuthus primigenius*, *Rangifer tarandus*, *Coelodonta antiquitatis*), steppe (*Lagurus lagurus*, *Ochotona pusilla*, etc.) and water element, varied in number but continuously existing (KOWALSKI, 1961; MADEYSKA, 1979, 1981; NADACHOWSKI, 1982; CHMIELEWSKI ed., in press).

In interglacial layers silvan birds were present (*Aegithalos caudatus*, *Regulus regulus*) and in Early Vistulian, birds nesting in tundra (*Lagopus mutus*, *L. lagopus*, *Lyrurus tetrix*; BOCHENSKI, 1974).

The period of the Middle Palaeolithic cultures development is characterized by considerable differentiation of the environment both areal and temporal, documented clearly by the coexistence of animals of different ecological demands. It is markedly visible in the Early Vistulian when a mosaik of different plant communities existed in the morphologically differentiated Cracow Upland with pretty large patches of forest side by side with the steppe communities and even shrub tundra.

## REFERENCES

- BOCHENSKI Z., 1974. *The birds of the Late Quaternary of Poland* (in Polish with Eng. sum.). 197 pp. PWN. Warszawa.
- CHMIELEWSKI W., 1961. *Civilisation de Jerzmanowice*. 92 pp. IHKM PAN. Wrocław-Warszawa-Kraków.
- CHMIELEWSKI W., 1969. Ensembles Micoquo-Prondnikiens en Europe Centrale. *Geogr. Polon.*, 17, 371-386. Warszawa.



- CHMIELEWSKI W., 1975. Paleolit środkowy i górny. In: *Prahistoria Ziemi Polskich*, I, 9-158. Wrocław-Warszawa-Kraków-Gdańsk.
- CHMIELEWSKI W. (ed.), in press. The investigations of the cave deposits in the Saspówka Valley. *Prace Inst. Arch. UW*, 1. Warszawa.
- CHMIELEWSKI W., KONECKA-BETLEY K. and MADEYSKA T., 1977. Palaeolithic site Kraków-Zwierzyniec I in the light of investigations in 1972-1974. *Biul. IG*, 305, 13-30. Warszawa.
- KOWALSKI K., 1961. Pleistocene rodents from Nietoperzowa cave in Poland. *Folia Quatern.*, 5, 22 pp. Kraków.
- KOZŁOWSKI J.K. and KOZŁOWSKI S.K., 1977. *Stone Age in Poland* (in Polish with English summary). 384 pp. PWN. Warszawa.
- KRUKOWSKI S., 1939-1948. Paleolit. In: *Encyklopedia Polska*, IV, 1-117. PAU. Kraków.
- MADEYSKA-NIKLEWSKA T., 1969a. Upper pleistocene deposits in caves of the Cracow Upland (in Polish with Eng. sum.). *Acta Geol. Polon.*, 19/2/, 341-392. Warszawa.
- MADEYSKA-NIKLEWSKA T., 1969b. Situation stratigraphique des ensembles micoquo-prondnikiens. *Geogr. Polon.*, 17, 387-393. Warszawa.
- MADEYSKA-NIKLEWSKA T., 1979. The environment of Middle and Upper Palaeolithic cultures in Poland. *Quaternary Studies in Poland*, 1, 15-28. Warszawa.
- MADEYSKA-NIKLEWSKA T., 1981. Le milieu naturel de l'Homme du Paléolithique moyen et supérieur en Pologne à la lumière des recherches géologiques (in Polish with French sum.). *Studia Geolog. Polon.*, 69, 125 pp. Warszawa.
- MADEYSKA-NIKLEWSKA T., 1982. The stratigraphy of Palaeolithic sites of the Cracow Upland. *Acta Geol. Polon.*, 32 [3-4/], 227-242. Warszawa.
- MORAWSKI W., 1975. Middle Palaeolithic flint assemblages from the Piekary IIa Site. *Swiatowit* 34, 139-146. Warszawa.
- NADACHOWSKI A., 1982. *Late Quaternary rodents of Poland with special reference to morphotype dentition analysis of Voles*. 108 pp. PWN. Warszawa-Kraków.
- Studies on Raj Cave near Kielce (Poland) and its deposits. 1972. *Folia Quatern.*, 41, 148 pp. Kraków.